# 3 Alternatives

# 3.0 ALTERNATIVES

This section describes the process used to identify, screen, eliminate from consideration, and retain alternatives for analysis. Sections 3.1 and 3.2 describe the criteria used to develop a reasonable range of alternatives. Section 3.3 discusses potential alternatives that were considered but eliminated from further analysis. Section 3.4 presents alternatives considered throughout the document, and Section 3.5 presents references for this chapter.

## 3.1 SELECTION OF ALTERNATIVES

According to the National Environmental Policy Act (NEPA), Commandant Instruction M16475.1D NEPA Implementing Procedures and Policy for Considering Environmental Impacts for the United States Coast Guard Implementation Regulations, and the California Environmental Quality Act (CEQA) and its implementation regulations, governmental decision-makers must consider reasonable alternatives to a proposed action that could result in significant environmental effects. To be “reasonable,” the alternatives must:

- Satisfy most of a project’s basic objectives;
- Avoid or substantially lessen any of a project's significant effects; and
- Be feasible.

“Feasible” means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors (California Public Resources Code § 21061.1.).

The analysis of alternatives follows a three-step process:

- Potential alternatives are identified;
- The potential alternatives are screened to determine those that are reasonable. Reasons for eliminating potential alternatives from further consideration are briefly explained; and
- The potential alternatives that are not eliminated are evaluated for environmental impacts, similar to the manner in which the proposed Project's impacts are evaluated.

This Revised Draft EIR presents a reasonable range of alternatives in accordance with NEPA and the CEQA. For this Project, alternatives were retained for evaluation (carried forward into the Chapter 4 analysis) if they would feasibly attain most of the basic objectives of the proposed Project, but would avoid or substantially lessen any of the significant effects of the proposed Project. Under NEPA, alternatives analysis is governed by the rule of "reasonableness."[1] Similarly, under the CEQA, there is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason (State CEQA Guidelines § 15126.6). That is, the alternatives considered should be reasonable as defined by the CEQA.

## 3.2 IDENTIFICATION OF A REASONABLE RANGE OF ALTERNATIVES

The first step in the analysis is to identify potential alternatives. Previous studies, the Project Deepwater Port (DWP) application, and scoping and public comments on the October 2004 Draft EIS/EIR were used to develop the initial list of alternatives and to refine alternatives to be considered for evaluation (see Table 3.2-1). Representative comments from the public and agencies include the following:

Alternatives to the proposed Project, e.g., avoiding the need for new or increased supplies of natural gas:

- Increased conservation of energy;
- Increased use of renewable sources of energy, such as solar and wind energy; and
- Retrofitting existing power plants with natural gas turbines or other technologies to reduce natural gas consumption by increasing efficiency.

Alternative sites:

- Offshore: Vandenberg Air Force Base/Point Conception; farther from the Channel Islands National Marine Sanctuary (CINMS) and other ecologically sensitive areas; west side of the Channel Islands; offshore Camp Pendleton; and Gaviota Pass; and
- Onshore: Channel Islands; Point Conception.

Alternative liquefied natural gas (LNG) regasification facilities and technologies.

Alternatives to the proposed onshore pipeline routes:

- Routes that would avoid Ormond Beach and other wetland restoration sites;
- Routes that would provide a more direct entry to the natural gas pipeline network; and
- Routes that would be located in rural, unpopulated areas and away from schools, colleges, senior housing, hospitals, detention centers, and seismic hazards.

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[1] See Council on Environmental Quality (CEQ), "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," Questions 1-7, on-line at http://ceq.eh.doe.gov/nepa/regs/40/40p3.htm

Alternative technologies:

- Regasification of LNG onboard a moored LNG carrier;
- Use of an onshore power source connected to the proposed floating storage and gasification unit (FSRU) by an underwater power cable;
- Diesel engine cooling; and
- Use of an onshore power source connected to the FSRU by an underwater power cable; diesel engine cooling.

**Table 3.2-1 Components of the Proposed Project and Potential Alternatives**

| Alternative Concept | Options/Locations (Section Discussed)[a] | | Evaluated as an Alternative in Chapter 4? |
|---|---|---|---|
| No project | No Action Alternative (3.4.1) | | Yes |
| Other sources of energy | Energy Conservation (3.3.1) | | No |
| | Renewable Energy Sources (3.3.2) | | No |
| | Retrofitting Existing Power Plants (3.3.3) | | No |
| | New or Expanded Pipeline Systems (3.3.4) | | No |
| Terminal locations | Regional offshore locations | Baja California, Mexico (3.3.5) | No |
| | | Washington/Northern Oregon (3.3.6.1) | No |
| | | Southern Oregon/Northern California (3.3.6.2) | No |
| | | San Francisco Bay to Point Conception (3.3.6.3) | No |
| | | Los Angeles to the Mexican border (3.3.6.4) | No |
| | Onshore California | Horno Canyon at Camp Pendleton, Rattlesnake Canyon, Little Cojo at Point Conception, Deer Canyon, Channel Islands (3.3.7.3) | No |
| | Offshore California | **Cabrillo Port (2.0)** | -- |
| | | Santa Barbara Channel (Ventura Flats), including offshore pipeline via Platform Grace, Reliant Energy Mandalay Generating Station Shore Crossing, and Gonzales Road Pipeline (3.4.2) | Yes |
| | | Gaviota Pass, Offshore of Camp Pendleton, Deer Canyon, Anacapa Island, Chinese Harbor, Smugglers Cove, San Pedro Point, West side of the Channel Islands (3.3.7.4) | No |
| Deepwater port concepts | Floating terminal | **Floating storage and regasification unit (FSRU) (2.2)** | -- |
| | | Single-point mooring direct regasification (e.g., Energy Bridge) (3.3.8.3) | No |
| | | Multiple-point mooring direct regasification (3.3.8.3) | No |
| | Fixed terminal | Platform (3.3.8.1) | No |
| | | Gravity-based structure (3.3.8.2) | No |

**Table 3.2-1 Components of the Proposed Project and Potential Alternatives**

| Alternative Concept | Options/Locations (Section Discussed)[a] | | Evaluated as an Alternative in Chapter 4? |
|---|---|---|---|
| Alternative technologies | Regasification methods | **Submerged combustion vaporizer (2.3.1.3)** | -- |
| | | Alternative vaporizer technologies (3.3.9.1) | No |
| | Technologies used on the FSRU | **Moss tank storage (2.2.2.3)** | -- |
| | | Membrane storage (3.3.9.2) | No |
| | | Onshore power source (3.3.9.3) | No |
| | | Alternative diesel engine cooling (3.3.9.4) | No |
| Pipeline routes and installation methods | Offshore pipeline route | **Project offshore pipeline route (2.3)** | -- |
| | | Offshore Pipeline Route 1 (3.3.10.1) | No |
| | | Offshore Pipeline Route 2 (3.3.10.2) | No |
| | | Offshore Pipeline Route 3 (3.3.10.3) | No |
| | Shore crossing pipeline | **Reliant Energy Ormond Beach Generating Station Shore Crossing (2.3.2)** | Yes |
| | | Point Mugu Shore Crossing/Casper Road Pipeline (3.4.3.1) | Yes |
| | | Arnold Road Shore Crossing/Arnold Road Pipeline (3.4.3.2) | Yes |
| | | Reliant Energy Mandalay Generating Station Shore Crossing (3.4.2) | Yes |
| | | **Horizontal directional boring (2.6.1)** | -- |
| | Shore crossing pipeline installation methods | Horizontal directional drilling (3.3.11) | No |
| | | Trenching (3.3.11) | No |
| | Center Road onshore pipeline route | **Center Road Pipeline (2.4.1.1)** | -- |
| | | Center Road Pipeline Alternative 1 (3.4.4.1) | Yes |
| | | Center Road Pipeline Alternative 2 (3.4.4.2) | Yes |
| | | Center Road Pipeline Alternative 3 (3.4.4.3) | Yes |
| | | Center Road Pipeline Alternatives 1A and 1B (3.3.12.1) | No |
| | Line 225 Pipeline Loop onshore route | **Line 225 Pipeline Loop (2.4.2.1)** | -- |
| | | Line 225 Pipeline Loop Alternative 1 (3.4.4.2) | Yes |
| | | Line 225 Pipeline Loop Alternative 2 (3.12.2) | No |

*Note:*
[a]Components in **bold** are part of the proposed Project identified in Chapter 2.

## 3.3 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

The detailed evaluation of a potential alternative to the proposed Project by the USCG, MARAD, and the CSLC is based on reasonableness (see Section 3.1, "Selection of Alternatives"). The following sections identify the potential alternatives that were determined not to meet this definition and the basis for those determinations.

Accordingly, these alternatives are not evaluated in detail in this document. Alternatives retained for evaluation in more detail are identified on Table 3.2-1 and described in Section 3.4, “Alternatives Evaluated in Chapter 4.0.”

### 3.3.1 Energy Conservation

Energy conservation measures were considered but not evaluated as an alternative because they are ongoing activities that would occur regardless of whether or not the proposed Project proceeds. In addition, energy conservation measures are already factored into California’s energy supply and demand analyses, which conclude that additional supplies of natural gas are necessary, after full consideration of the projected contributions of energy conservation, to meet California’s projected energy demands. The Energy Action Plan II, prepared by the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) expressly acknowledges, in full consideration of energy conservation data and programs, the need to ensure a reliable supply of reasonably priced natural gas (CEC and CPUC 2005). Even taking into account increased conservation measures, natural gas demand is expected to increase by about 0.7 percent annually, from 2006 to 2016, according to the (CEC) 2005 Integrated Energy Policy Report Committee Final Report (CEC 2005a). Denial of the Project would not reduce the amount of natural gas required to meet projected State needs.

The State of California is actively working to decrease its per capita use of electricity through increased energy conservation and efficiency measures. Energy conservation measures include actions such as improving new and remodeled building efficiency, improving air conditioner efficiency and appliances, and creating customer incentives to reduce energy demand.

According to the State of California’s Energy Action Plan II: Implementation Roadmap for Energy Policies, cost effective energy efficiency is the State of California’s first choice for meeting California’s energy needs because it represents the least cost, most reliable, and most environmentally-sensitive resource, and minimizes California’s contribution to climate change (CEC and CPUC 2005). California’s energy efficiency programs are the most successful in the nation and the State wants to continue to build upon them.

In addition, the CPUC has established an ongoing rulemaking, R.01-08-028, Order Instituting Rulemaking to Examine the Commission’s Future Energy Efficiency Policies, Administration and Programs. CPUC Decision D.04-09-060, Interim Opinion: Energy Savings Goals for Program Year 2006 and Beyond, defines and establishes an energy efficiency program with policies and goals for electricity and natural gas savings with planned updates of these goals every three years. It also translates the Energy Action Plan’s mandates into explicit, numerical electricity and natural gas savings goals for California’s four largest investor-owned utilities.

Although some energy conservation measures can be implemented in the short- and mid-term, many measures to improve energy conservation address long-term energy policy and usage considerations. For example, a measure such as changing the energy efficiency requirements for a building requires a considerable amount of time to implement. Older buildings will be grandfathered; therefore, they will not implement the new building codes. It will take time for new building stock to be built to the new standards to replace older buildings. Similarly, once energy efficiency standards are adopted for appliances, a phase-in period is required as the new appliances are purchased and the old, less energy-efficient appliances continue to be used until the end of their economic lives. These types of energy efficiency improvement strategies and policies are necessarily long-term. Even assuming increased conservation would occur, additional natural gas supplies would be required according to the CEC and the CPUC projections.

The MARAD and the CSLC do not have authority to initiate or implement additional broad-based, long-term energy conservation policy measures beyond those previously described. They also do not have control over whether such measures will be proposed, approved, and implemented, or the time frame over which these actions might occur. Nonetheless, the agencies' actions could impact the State's energy supply mix. Any decision by the government to increase subsidies or otherwise promote additional conservation would be independent of actions taken on this DWP application by MARAD and the CSLC.

Energy conservation is, therefore, not a reasonable alternative to the Project and is not further evaluated as such in this report. Energy conservation is discussed, however, as part of the baseline energy conditions for the proposed Project in Section 4.10.1, "Energy and Minerals – Environmental Setting."

### 3.3.2 Renewable Energy Sources

Similar to energy conservation, renewable energy is not evaluated as an alternative to the proposed Project because such sources are already factored into California's energy supply and demand analyses, which conclude that additional supplies of natural gas are necessary, after full consideration of the projected contributions of renewable sources, to meet California's projected energy demands. Renewable sources include solar, wind, geothermal, hydropower, and others. Any decision by the government to increase subsidies or otherwise promote renewables would be independent of actions taken on this DWP application.

The State of California already has legislated aggressive programs to increase the quantity of electricity generated from renewable energy sources to 20 percent, from the current 11 percent, by 2017. In the recently published Energy Action Plan II, the State's objective is to accelerate its goal of generating 20 percent of its electricity from renewables from 2017 to 2010 and to generate 33 percent of the State's electricity with renewables by 2020 (CEC and CPUC 2005).

California's natural gas demand growth is expected to be slower than the rest of the nation's due to the State's energy efficiency programs and the use of renewable energy for electricity generation. Nevertheless, total natural gas demand in California is projected to increase by 0.7 per year from 2006 to 2016. A component of State policy is to diversify the electricity system with renewables, partly in response to growing natural gas dependence; however, administrative procedures have hindered the State's goals to meet its renewable energy goals. In addition, CEC recommends that California diversify its natural gas supply because the State relies on out-of-state sources for 87 percent of its natural gas supplies and neighboring states are increasing their demand for supplies. The CEC's projections of future energy demand incorporate the growing use of renewable sources and still conclude that the need for natural gas will increase (CEC 2005a).

Information regarding existing, known, and proposed renewable projects is presented below. Federal projections regarding renewable energy sources are discussed in Section 1.2.2, "Natural Gas Need in the U.S."

Southern California Edison (SCE) is the major power producer in the Southern California region. In 2004, SCE had a renewables portfolio of 2,588 megawatts (MW) of electricity, including 1,021 MW from wind, 892 MW from geothermal, 354 MW from solar, 226 MW from biomass, and 95 MW from small hydroelectric, which constitute approximately 18 percent of its capacity (Edison International 2005). In 1999, natural gas-powered generation constituted 63 percent of SCE's capacity (CEC 2005b). SCE plans to issue 12 new renewable energy contracts with a maximum potential capacity of 1,630 MW (Edison International 2005). The use of renewables is limited to the generation of electricity.

Planned and proposed wind projects in Southern California are listed in Table 3.3-1. The projected energy from the planned and proposed wind projects is 673 MW. The power would be generated for seven utilities in the Southern California area. The new and existing wind projects are spread throughout California (American Wind Energy Association 2005).

In addition to wind energy projects, solar energy projects are planned or in place. Recently, SCE announced that it would develop, in conjunction with Stirling Energy, a 4,500-acre (1,820 hectare) solar facility near Victorville, California that would initially produce 500 MW (Edison International 2005). Approvals are still necessary before construction is to begin, but it is anticipated that 40 dishes that would generate 1 MW will be in place by the end of 2006. The operators plan to generate 50 MW by 2008 and 500 MW by 2011 (Port 2005).

The projects listed above demonstrate that renewable energy sources are being developed independently of the proposed Project. The CEC's projections of future natural gas supply needs for the State include the assumption that renewable energy projects will be implemented, yet still conclude that additional natural gas supplies are necessary.

**Table 3.3-1 Planned and Proposed Wind Projects in Southern California**

| Project | Utility/Developer | Location | Status | MW Capacity | Online Date/ Turbine |
|---|---|---|---|---|---|
| Alta Mesa IV | Tenderland Power/ CHI Enel | San Gorgonio Pass | NA | 40 | 2005/660 KW Vestas |
| Tehachapi | Coram Energy LLC | Tehachapi | Under construction | 4.5 | 2005/1500 KW GE Wind |
| Kumeyaay Wind Power Project | Superior Renewable Energy | San Diego County | Under construction | 50 | 2005/2 MW Gamesa |
| Pacific Renewable | PG&E | Lompoc | NA | 83 | 2005/NA |
| Pine Tree Wind Project | Zilkha/Los Angeles Department of Public Works | Mojave (North) | Proposed | 120 | NA |
| Mohave Wind Farm | SCE/ Windland, Inc. | Mojave | Proposed | 60 | NA |
| Tehachapi Repower | SCE/ Windland, Inc. | Tehachapi | Proposed | NA | NA |

*Source*: American Wind Energy Association 2005. Wind Projects Database. http://www.awea.org/projects/california.html

*Notes*: NA = not available; PG&E = Pacific Gas & Electric; SCE = Southern California Edison; KW = kilowatt; MW = megawatt; GE = General Electric.

None of the three lead agencies for the proposed Project (USCG, MARAD, and the CSLC) has authority to initiate or implement additional new broad-based policies to promote the expanded use of renewable energy resources beyond what is already anticipated under the State's existing aggressive program. Nonetheless, the agencies' actions with respect to the proposed Project could impact the State's energy supply mix and might indirectly affect energy costs. Based on all information presently available, it does not appear that Project approval would modify the role of renewable sources in the State's energy supply mix; however, denial of the proposed Project would not reduce the amount of natural gas required to meet the State's projected needs.

Therefore, renewable energy is not evaluated as an alternative to the proposed Project in this document because such measures would not eliminate the need for both short- and mid-term supplies of additional natural gas, which is the purpose for which the Project is proposed, pursuant to the provisions of the Deepwater Port Act. In addition increased use of energy from renewable sources would occur with or without the proposed Project and use of additional renewable sources beyond the State's existing mandates is not within the control of the lead agencies. However, renewable energy sources are considered as part of the environmental baseline conditions of energy supply and are discussed in Section 4.10, "Energy and Minerals."

### 3.3.3 Retrofitting Existing Power Plants

The installation of more efficient natural gas-fired turbines at existing natural gas-fired electricity generation plants ("turbine re-powering") was considered, but not evaluated as an alternative for further analysis in this report for several reasons: (1) the CEC has determined that the State's natural gas supply must be increased whether or not turbine re-powering occurs; and (2) the proposed turbine re-powering would occur at locations and power plants over which MARAD and the CSLC have no jurisdiction and that the Applicant for the proposed Cabrillo Port Project does not own, control, or have the experience or expertise to operate.

The re-powering of natural gas-fired power plants is being driven by economic and environmental factors not directly related to natural gas supply, i.e., primarily the inefficiency of operating these older power plants and the cost of complying with air quality regulations. The turbine re-powering alternative is moving forward and would not be affected by a decision on the proposed Project.

The main agency with jurisdiction over the operation of existing natural gas power plants in California is the CEC, which has recently approved or is considering approval of several turbine re-powering projects. The State of California's 2005 Energy Action Plan II indicates that despite energy-efficient renewable resources, other energy sources, and investments in conventional power plants such as augmenting existing facilities and replacing aging infrastructure, there is no indication that the need to increase California's short-term natural gas supplies can be averted through turbine re-powering (CEC and CPUC 2005). The State's determination of the need for additional natural gas supplies takes into account the re-powering of existing power plants and still concludes that new gas supplies are needed. In sum, there is no indication that proposed turbine re-powering would avert the need to increase California's short-term and mid-term natural gas supplies.

### 3.3.4 New or Expanded Pipeline Systems

California receives approximately 87 percent of its natural gas supply from other states and western Canada via gas transmission pipelines. Since 2000, California has imported approximately 5.5 billion cubic feet (156 million cubic meters [$m^3$]) per day of natural gas. During the same time, U.S. production of gas has flattened (Marks et al. 2005). In-state supplies are limited, and the supplies are allocated. Of the 989 million cubic feet (MMcf) (28 million $m^3$) per day produced in California in 1999, only 48 percent was delivered by natural gas utilities. The remainder was either consumed at or near the point of production or delivered for use by a nonutility pipeline network (Gopal 2000). In addition, within California an expansion of the existing intrastate network is unlikely because supplies in these fields are diminishing. Expansion of the interstate pipeline network, such as the conversion, by El Paso Natural Gas Company, of approximately 304 miles of an existing oil pipeline (All American Pipeline) to natural gas service, could temporarily increase the delivered volumes of gas to or from the State, but it would not increase the diversity of the natural gas supply.

Construction of a new gas pipeline would most likely involve disruptive activities through the desert. The Kern River 2003 Expansion Project EIS/EIR states that construction would cause long-term consequences for vegetation and wildlife habitat, which would be removed during construction, as well as potential impacts on threatened and endangered species endemic to the desert, such as the desert tortoise (FERC and CSLC 2002). Although construction of a new pipeline would increase supply and potentially add to the supply from the Rocky Mountains, depending on the source of the natural gas, it would shift the potential environmental impacts from one project to another.

Expanded pipeline systems would not meet the Project objective of increasing the diversity of natural gas supplies to California. In addition, construction of new or expanded pipeline systems would have environmental consequences along whatever corridors were proposed. Therefore, new or expanded pipeline systems were not considered as alternatives to the proposed Project.

### 3.3.5 Northern Baja Mexico LNG Terminals

The use of Northern Baja Mexico LNG Terminals as a potential alternative to the proposed Project was eliminated from further analysis because it is presently uncertain whether such projects could meet the Project objective of supplying 800 MMcf (22.7 million $m^3$) of natural gas from the Pacific Rim directly into the existing Southern California natural gas distribution infrastructure. LNG terminals in Northern Baja would also supply the growing demand for natural gas in Northern Baja. Neither the State of California nor the Federal government has jurisdiction over LNG terminals in another sovereign nation or over contracts governing the distribution of natural gas imported through such terminals.

Three LNG terminals are proposed for Baja California: Shell/Sempra's Energia Costa Azul located 14 miles (22.5 kilometers [km]) north of Ensenada; Chevron's Terminal GNL Mar Adentro de Baja California near the Coronado Islands and offshore of Tijuana; and the Moss Maritime LNG Project offshore of Rosarito Beach (CEC 2005c, 2005d).

Shell/Sempra broke ground for their onshore Energia Costa Azul LNG terminal in March 2005, but they face legal challenges in Mexican courts. If successfully completed, the Shell/Sempra Energia Costa Azul expects to begin commercial operations in 2008. This project would include a land-based receiving facility and related port infrastructure. Onshore, the project would cover 400 acres (162 hectares [ha]) of land and would have two full containment tanks, open-rack seawater vaporizers, and a 42-mile (68 km) 36- to 42-inch (0.9 to 1.1 m) diameter spur pipeline connecting the terminal to the Bajanorte Pipeline. As proposed, the facility would have a capacity of 1,000 MMcf (28 million $m^3$ per day); however, there is sufficient space on site to expand the operations to include two additional storage tanks to increase the capacity to an average of 2,000 MMcf (57 million $m^3$) per day, with a peak of 2,600 MMcf (74 million $m^3$) per day.

Additional permitting would be required for this expansion (CEC 2005c). Once operations begin, Sempra/Shell anticipates 500 MMcf (14 million $m^3$) per day to serve the needs of Mexico and the remainder would serve the southwestern U.S. (Sempra 2003 and 2005). This amount is equivalent to half the LNG that would be received at the terminal (Sempra 2005). The CPUC authorized Sempra Energy and Royal Dutch/Shell Group to create a border point where natural gas converted from LNG could move from Mexican to U.S. pipelines (Los Angeles Times 2004). This action opens up the possibility of importation of natural gas from Mexico to Southern California and other southwestern U.S markets.

However, to export gas to California from a Baja terminal, new pipelines would have to be built or expanded. As an example, the CSLC and the Federal Energy Regulatory Commission (FERC) are currently preparing a Joint EIR/EIS for the North Baja Expansion Project (FERC Docket No. PF05-14-000), which proposes "…an interconnect with the existing SoCal Gas Company (SoCal Gas) system in Blythe, California, for delivery into California and other southwestern U.S. markets." Details on the specific allocation of gas between these markets is unknown at present. These additional components could have adverse environmental effects, which will be analyzed in the proposed Joint EIR/EIS.

In January 2005, Chevron of Mexico received a Federal permit to construct its proposed Adentro de Baja California project that would be located 8 miles (13 km) off the coast of Tijuana. It would be a gravity-based structure that would be fixed in a depth of water of 65 feet (20 meters [m]). The terminal would be a fixed 980-foot (300 m) long concrete island with two regasification plants, storage tanks, a heliport, and a dock for LNG carriers. At this offshore terminal, the LNG would be regasified using seawater, and a new underwater pipeline would connect with Baja California's existing gas pipeline system. The terminal would have the capacity to produce 700 MMcf (20 million $m^3$) per day and would serve U.S. West Coast and Mexican markets (CEC Staff 2005).

In April 2005, Moss Maritime and its partner, Terminals y Almacenes Maritimos de Mexico (TAMMSA), received permits from the Mexican environmental agency to proceed with an offshore LNG terminal. However, other federal and local permits are still needed before they can begin operations in 2008. Moss Maritime/TAMMSA is proposing to install an FSRU 5 miles (8 km) off the coast of Rosarito Beach in Baja California. The FSRU would have a single-point mooring system, and a pipeline would connect the FSRU to shore (MarineLog.com 2005). The FSRU would be a converted LNG carrier with a storage capacity of 4.4 MMcf (125,000 $m^3$) (Lindquist 2005b).

The CEC estimates that demand for natural gas in Baja California will grow by 7.6 percent per year (Parkhurst 2002). If one or more of these proposed LNG terminals were brought on-line, the gas demand in Baja California, a region with 15 million people, would likely absorb a significant part of the imported supplies. As a result, the proposed Mexican projects may not provide California with a reliable or sufficient natural gas supply in and of themselves but, in combination with other projects, could constitute a component of California's natural gas supply.

Because a Baja terminal would be located onshore or in Mexico's territorial waters, neither MARAD nor the CSLC would have jurisdiction to license facilities. Also, natural gas would not be transported from the outer continental shelf to the U.S., so MARAD would not have jurisdiction. Therefore, the U.S. would not have control over the design, approval, or monitoring of such facilities.

While potential impacts of a Baja California LNG offshore terminal would not occur in California, such a terminal would not necessarily result in fewer potential environmental effects than the proposed Project because many of the offshore effects would be equivalent to those that would occur in California waters. However, the onshore effects could be greater than those of the proposed Project because any onshore LNG terminal would have a large onshore footprint.

This alternative was eliminated because it would neither accomplish most of the purposes and objectives of the proposed Project to provide a large, secure supply of natural gas to the Southern California market nor result in reduced environmental effects relative to the potential effects identified for the proposed Project, but would merely transfer such impacts to another sovereign nation. In addition, the permitting, environmental review, and any ultimate approval of an LNG storage and regasification facility in Baja would be outside the jurisdiction of the CSLC and MARAD.

Specifically, the selection by the lead agencies of an alternative project location in Mexico, should this be proposed, would have unenforceable because no agency in the U.S. would have authority over any project in Mexico. Additionally, in May 2005, seven U.S. and Mexican environmental groups filed a challenge to Chevron of Mexico's Adentro De Baja California facility under the North American Free Trade Agreement (Lindquist 2005a). In light of all of these issues, it was determined that a Northern Baja site was not a reasonable alternative as defined under NEPA and the CEQA and that further analysis was therefore inappropriate and unwarranted.

### 3.3.6 Regional Offshore Alternatives

Other potential alternative locations for an offshore LNG terminal along the West Coast, without specifying exact locations within those regions, were identified by the Applicant and during scoping and the public comment period on the October 2004 Draft EIS/EIR. The following sections evaluate these regional offshore alternative locations.

#### 3.3.6.1 Washington/Northern Oregon Region

Five onshore LNG terminals are proposed in the Pacific Northwest region, including the Port Westward LNG facility on the Columbia River about 7 miles (11.3 km) from Clatskanie, Oregon; the Warrenton LNG Project in Warrenton, Oregon; the Northern Star LNG terminal in Bradwood, Oregon; and the Skipanon LNG facility in Warrenton, Oregon (CEC Staff 2005). There are no known proposals for offshore terminals.

An area near the mouth of the Columbia River, along the Washington-Oregon border, was considered for the location of an offshore terminal; however, it was eliminated because development of a terminal at this location would require a substantial upgrade of existing pipeline infrastructure, with the potential attendant environmental impacts, in order to reach Southern California. Moreover, if LNG shipments were to originate in Australia, South America, or Southeast Asia, the shipping distance would be greater than that for a location in California and would add to the cost of the gas supply. This terminal location was eliminated from further evaluation as a reasonable alternative due to inadequate site suitability, safety (offshore wind and wave conditions), and other environmental concerns.

#### 3.3.6.2 Southern Oregon/Northern California

Currently, the Jordan Cove Energy Project, an onshore LNG terminal proposed on the North Spit of Coos Bay, Oregon, is the only known LNG project proposed for this region. The proposed facility would have an onshore receiving terminal which would have an average natural gas delivery capacity of 200 MMcf (5.7 million $m^3$) per day. FERC is currently reviewing the application. If approved, it would begin operations in 2008 (CEC Staff 2005). There are no known proposed offshore terminals in this region.

The Eureka area was examined as a potential location for an offshore LNG terminal because it is the only location in the Northern California/Southern Oregon region with access to Pacific Gas and Electric Company's (PG&E's) main gas transmission systems. However, costs of improving existing access to these gas transmission systems would be very expensive. This alternative would also be located far from Southern California and would require significant new pipeline construction, thereby incurring high pipeline tariffs and not reducing the potential impacts relative to those impacts identified for the proposed Project. Additionally, there could be safety issues because the wave and wind conditions outside the harbor can be severe. In its 1978 Offshore LNG Terminal Study (see Section 3.3.7.2, "Ranking and Selection of Onshore LNG Terminal Sites and Offshore LNG Terminal Study (1978)"), the California Coastal Commission (CCC) eliminated areas between Point Conception and the Oregon border because of the adverse weather conditions (CCC 1978b). This alternative was reconsidered to determine whether conditions had changed. However, wind, waves, and fog in those locations could make marine operations hazardous and less reliable. This alternative is not reasonable and was eliminated from further evaluation because of inadequate site suitability, safety (offshore wind and wave conditions), environmental concerns, and because it fails to meet most of the objectives of the proposed Project.

#### 3.3.6.3 San Francisco Bay to Point Conception

Currently, no known LNG projects are planned or proposed in the area from the San Francisco Bay to Point Conception. Potential alternatives considered in Northern and Central California included sites within San Francisco Bay and Monterey Bay. Even though the CCC eliminated areas between Point Conception and the Oregon border in its 1978 Offshore LNG Terminal Study because of the adverse weather conditions, locations in this region were reconsidered to ascertain whether conditions have subsequently changed.

An alternative location in and around the San Francisco Bay was eliminated from further evaluation because of the lack of suitable sites within the bay and because the waters outside the bay from Bodega Bay to Monterey are classified in one of three national marine sanctuaries – Cordell Bank, Gulf of Farallones, and Monterey Bay National Marine Sanctuaries. There are no available sites in remote areas within the Bay where a terminal could be located, and a previously proposed onshore terminal at Mare Island was dropped due to public concern regarding the safety of the facility in a densely populated area. Congested waterways and navigation areas may present a hazard for LNG carriers. In addition, the presence of LNG carriers could disrupt commercial and recreational vessels in this intensively used bay. Therefore, this potential alternative was eliminated because it is infeasible and increases, rather than avoids, potential significant environmental impacts.

Siting a terminal anywhere offshore of Monterey Bay would mean that the terminal and/or the offshore pipeline would have to cross through the Monterey Bay National Marine Sanctuary. Altering the seabed of the Sanctuary by placing a structure in it is prohibited in the Sanctuary (MBNMS 2005).

The existing pipeline infrastructure in this region would also require significant upgrade or construction of a new large-diameter pipeline to deliver Project gas to the PG&E main gas transmission systems. In addition, a lack of protected areas for LNG carriers would limit operating periods because of the severity of winter storms.

The wind-wave conditions of the coast between Point Conception and Monterey Bay would significantly affect transfer operations between LNG carriers and a floating facility and would increase the potential risk of spills. Without significant hull strengthening, the increased swell dynamics in the area north of Point Conception would weaken a floating or fixed structure and would potentially compromise its structural integrity. This alternative also would be located far from Southern California and would require new pipeline construction, thereby incurring high pipeline tariffs and not reducing impacts relative to those effects identified for the proposed Project. Finally, this location was eliminated because of the wind-wave conditions that would not be favorable for an LNG facility and because it would conflict with the intended use of the marine sanctuaries. Sites north of Point Conception would not meet most of the objectives of the proposed Project, are prohibited within the Monterey Bay National Marine Sanctuary, and would require extensive onshore pipeline facilities; therefore, this location was not evaluated further.

#### 3.3.6.4 Los Angeles to the Mexican Border

Locations for an offshore terminal were considered from Los Angeles to the Mexican border. A component of the CCC's screening guidelines for selection of potential offshore LNG terminals was the proximity to population centers. Areas offshore of Los Angeles and Long Beach were not considered because of the population density of the nearby population centers and the existing and projected significant volume of vessel traffic in the area. San Diego Harbor is unsuitable for an LNG terminal because it would likely interfere with the operations of the U.S. Navy's Pacific Fleet, which is based in the harbor. Significant recreational boating in San Diego Harbor would also pose a difficult security and safety issue for the terminal and for LNG carriers. A number of chemical and conventional weapon disposal sites constrain suitable locations outside San Diego Harbor as well. For the terminal facility and pipeline to avoid these sites, the terminal would have to be sited near the major north-south shipping lanes, which is incompatible with necessary safety buffers. As stated above, the CCC eliminated areas offshore of

San Diego in its 1978 Offshore LNG Terminal Study. Therefore, because a reasonable site could not be identified, this location was eliminated from further consideration.

### 3.3.7 Specific California Locations

Locations from Point Conception south to north of the San Diego Harbor have, in the past, been considered as potential locations for both offshore and onshore LNG facilities. The history of this analysis is discussed below.

#### 3.3.7.1 LNG Terminal Siting Act of 1977

In the early 1970s, several public utilities proposed LNG import facilities at the Port of Los Angeles, Oxnard, and Point Conception. However, the agencies involved in site approval could not agree on a preferred site. As an attempt to resolve the stalemate at the State level, the California Legislature enacted the LNG Terminal Siting Act of 1977 (formerly California Public Utilities Code § 5550 et seq.). Under the Act, the CPUC, with input from the CCC and CEC, could approve one site. The LNG Terminal Siting Act was repealed in 1987. As a result, the CCC is not obligated to conduct a siting study for the proposed Project. To date, there is no known plan for a study similar to the one conducted in the 1970s.

#### 3.3.7.2 Ranking and Selection of Onshore LNG Terminal Sites and Offshore LNG Terminal Study (1978)

In 1978, under the mandate of the California LNG Terminal Siting Act, the CCC studied, based on sites nominated by the public and the CCC, 82 onshore and numerous offshore potential LNG terminal locations as a neutral, environmentally protective agency using specific siting criteria (CCC 1978a, 1978b). These two studies represent the most comprehensive review of potential LNG terminal locations in California to date. The studies also included a public consultation process for both onshore and offshore studies, with more than 700 interested persons participating.

The CCC was not considering a specific application at the time; therefore, there was no bias for or against any location. Although the LNG Terminal Siting Act was repealed in 1987 and many technologies have improved (specifically, pipelines can be laid at greater water depths), most of the siting criteria are still relevant and useful in the evaluation of potential alternative site locations. The conclusions of these studies have been used as a starting point in this document's analysis of onshore and offshore LNG terminal alternatives in California. The following paragraphs summarize the conclusions of the CCC studies. Excerpts from both studies are included in Appendix E of this document.

The Act specified a siting criterion that the population density could be no more than 10 people per square mile (2.6 square kilometers [$km^2$]) within 1 mile (1.6 km) of the terminal and no more than 60 people per square mile (2.6 $km^2$) within 4 miles (6.4 km). Other considerations included wind, wave, and fog conditions, proximity to urban areas, earthquake faults, soil conditions, and rugged land (CCC 1978a).

*Onshore LNG Terminal Site Analysis Overview*

The CCC concluded that any onshore LNG terminal would have serious effects on coastal resources and that all proposed sites would lead to major adverse effects on natural marine and wildlife resources, public recreation areas, and other resources protected by the California Coastal Act of 1976. The marine environment would be disturbed by construction activities, including trenching, blasting, and pile driving. Regular LNG tanker maneuvering, fuel oil deliveries, and tug and line boat activity would continuously bring noise and activity in areas used by sea birds and mammals, including the California gray whale. Because all of the onshore locations are relatively remote and undisturbed, an onshore LNG terminal would also alter the character of the area and disturb valuable wildlife populations (CCC 1978a).

Four onshore sites were found to meet the population density criteria for an onshore LNG terminal location and to be feasible when adverse wind and wave conditions, earthquake faults, soil conditions, and other factors were considered (CCC 1978a). These four sites, in the order ranked by the CCC, were Horno Canyon in Camp Pendleton (San Diego County), Rattlesnake Canyon (San Luis Obispo County), Little Cojo near Point Conception (Santa Barbara County), and Deer Canyon (Ventura County). After the ranking was completed, an earthquake fault was found near the Little Cojo site. Since there was a pending application for this location, it required further evaluation. Contingent upon demonstration of earthquake safety, the CPUC conditionally approved Point Conception (Little Cojo) because of its remote location; however, the proponents cancelled the project when they determined that the then price of natural gas made LNG uncompetitive (CCC 1978a).

*Offshore LNG Terminal Analysis Overview*

Concurrent with the preparation of terminal ranking evaluation, the CCC conducted a similar study for an offshore terminal. Major selection criteria specified that the site needed to be in water depths less than 750 feet (229 m) due to subsea pipeline installation constraints; have a gently sloping bottom topography; and have a hospitable wind, wave, and swell environment. These criteria are discussed further in Section 3.3.7.4, “Alternative California Offshore Locations.” As previously indicated, the depth limitation is no longer applicable because advances in technology enable pipelines to be laid in much deeper waters.

Areas offshore of Central and Northern California between Point Conception and the Oregon border were eliminated from further consideration because of adverse weather conditions and the presence of military operations, ship traffic, and marine and coastal resources. No population density criteria were applied to the siting of an offshore facility; however, locations within 4 miles (6.4 km) of a permanent population of 1,800 persons were eliminated. Thus, offshore areas within 4 miles (6.4 km) of Los Angeles, Long Beach, and San Diego were eliminated.

The study evaluated seven zones and then 16 sites between Point Conception and the Mexican border. Eventually, seven sites were selected as potential terminal locations, including Ventura Flats, offshore of Deer Canyon, offshore of Camp Pendleton, offshore of Chinese Harbor, offshore of Smuggler's Cove, offshore of San Pedro Point, and Bechers Bay. Ventura Flats was selected as the optimal location.

#### 3.3.7.3 Alternative California Onshore Locations

According to the CEC's 2003 Liquefied Natural Gas in California: History, Risks, and Siting, Staff White Paper, the siting criteria used by the CCC and CPUC in the 1970s are still applicable (Marks et al. 2003). As stated above, the CCC selected Horno Canyon in Camp Pendleton, Rattlesnake Canyon, Little Cojo at Point Conception, and Deer Canyon as those that best met its criteria for an onshore LNG terminal location, and the CPUC conditionally approved the Point Conception site, which was owned at the time by SCE and PG&E (Ahern 1980). Figure 3.3-1 shows onshore and offshore alternatives to the proposed Project and their locations.

In its 1978 study, the CCC did not formally reject the potential Point Conception onshore location because it could not do so under the constraints of the LNG Terminal Act of 1977 (because there was a pending application for use of this area); however, the report expressed serious concerns due to the seismic conditions in the area. The current owners of the land at the Point Conception location approved in 1978—the Bixby Ranch, the Hollister Ranch, and the Archer Trust—objected to the use of their land for industrial development and are considering putting a conservation easement on the property (Staffier 2004; Kimball 2004). Consequently, this site is not considered a viable alternative location for an onshore terminal due to seismic conditions and land use conflicts.

An LNG terminal onshore on one of the Channel Islands is not a feasible option due to potential land use conflicts. The islands north of the proposed facility location are under the jurisdiction of the National Park Service (NPS). Santa Barbara Island, which is located south of the proposed Cabrillo Port location, is also part of Channel Islands National Park (CINP). Certain provisions of Title 36, Code of Federal Regulations, Chapter 1, Parts 1-7, authorized by Title 16 United States Code, § 3 apply to all lands and waters administered by the NPS within the boundaries of the CINP. These provisions are intended to conserve the sensitive marine organisms and other resources that occur in nearshore waters of the CINP. Enforced restrictions include limits on marine vessel traffic and public use, special area closures, and designations for specific uses or activities (NPS 2004).

The presence of an LNG terminal would conflict with the intended purpose of the CINP and therefore is not a reasonable or feasible alternative. Similarly, San Nicolas Island is owned by the U.S. Navy. Part of its intended use is ordnance and missile testing; therefore, the presence of an LNG terminal would conflict this use and is not a reasonable or feasible alternative. No onshore Channel Island location represents a feasible alternative; thus, siting an LNG facility onshore of one of the Channel Islands was eliminated from further consideration in this document.

Compared to the site proposed by the Applicant, onshore LNG terminals, although potentially feasible, would neither avoid nor lessen any of the potentially significant effects on the environment identified for the proposed Project. Under the Deepwater Port Act, MARAD may only consider a DWP beyond 3 nautical miles (NM) (3.45 miles or 5.56 km) from shore.

An onshore LNG terminal at the Port of Long Beach has been proposed by Sound Energy Solutions, and the Federal Energy Regulatory Commission (FERC) and the Port of Long Beach have published the Draft EIS/EIR. MARAD and the CSLC do not have the authority to license this project. The onshore LNG terminal at the Port of Long Beach could be authorized whether or not Cabrillo Port is licensed and both projects could be licensed simultaneously. Hence, an onshore LNG terminal at the Port of Long Beach is a competing project and, as such, does not represent a true alternative to the proposed Project. The potential cumulative effects of the presence of both facilities are, however, evaluated in Section 4.20, “Cumulative Impacts Analysis.”

#### 3.3.7.4 Alternative California Offshore Locations

Nine offshore sites were evaluated as potential alternatives to the proposed Project: the seven sites identified in the 1978 CCC Offshore LNG Terminal Study, as well as two sites identified during public scoping—Anacapa and the west side of the Channel Islands. A proposal by Crystal Energy to construct an offshore LNG terminal at Platform Grace, for which preparation of a separate EIS/EIR is anticipated, is evaluated in Section 4.20, “Cumulative Impacts Analysis.” Evaluation criteria from the CCC study included: (1) ownership, use, and character of the area around each site zone; (2) site availability; (3) recreational resources; (4) marine and terrestrial biology; (5) geologic and engineering considerations affecting terminal feasibility; (6) choice of design types; (7) pipeline routing feasibility and impacts; (8) maritime conditions; and (9) construction costs.

The following analysis uses the 1978 criteria and updates the information as appropriate. All of the sites, except Ventura Flats, were eliminated from further consideration for the reasons detailed below. Ventura Flats is discussed in Section 3.4.2, “Alternative Deepwater Port, Subsea Pipeline, Shore Crossing, and Onshore Pipeline Location – Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline Alternative.” (For the purposes of this document, this alternative is called the Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline Alternative.)

**Gaviota Pass**

Gaviota Pass, near the coastline approximately 15 miles (24 km) east of Point Conception, was considered as an alternative offshore location. Gaviota Pass is very close to two onshore sites, Little Cojo and Las Varas, which were evaluated in the CCC's 1978 Final Report Evaluating and Ranking LNG Terminal Sites. The Las Varas site was rejected because of the presence of a seismic fault, and a similar fault was found at Little Cojo. The CCC did not consider offshore locations in the Santa Barbara

Insert – (1 of 2)

**Figure 3.3-1 Cabrillo Port Liquefied Natural Gas Deepwater Port and Potential Alternatives Considered**

Insert – ( 2 of 2)

Figure 3.3-1 Cabrillo Port Liquefied Natural Gas Deepwater Port and Potential Alternatives Considered

County area because "any offshore LNG terminal near the mainland in western Santa Barbara Channel would conflict with the valuable marine and recreational resources present there" (CCC 1978b). Gaviota Pass was not retained for evaluation as an alternative offshore location because of the potential seismic activity in the area and the potential conflicts with marine and recreational resources present in that part of the Santa Barbara Channel.

**Offshore of Camp Pendleton**

The CCC 1978 offshore report identified a site offshore of Camp Pendleton, approximately 1.5 to 3 miles (2.4 to 4.8 km) offshore of a long stretch of San Diego County coastline. The CCC concluded that the either a floating or fixed facility would be feasible because the location met the geotechnical, population density, and marine resources criteria. However, the CCC recognized that there were potential seismic problems, recreational conflicts, safety issues, and aesthetic concerns. Currently, as described below, despite the advances in technology, the potential negative aspects of the site have increased since the 1978 CCC report.

For example, the site offshore of Camp Pendleton would be highly visible to a large number of people traveling on Interstate 5. Its presence also would degrade the recreational experience of beach visitors at San Onofre State Park and would restrict access for local boaters and sport fishers because there would be an exclusion zone around the facility and any approaching LNG tanker. Additionally, the population of the areas surrounding Camp Pendleton has increased since the original recommendation in 1978: San Clemente has grown by almost 23,000 people since 1980 and Oceanside has grown by almost 33,000 people since 1990 (City of Oceanside 2001). In addition, there is a fault 4 miles (6.4 km) offshore.

The U.S. Marine Corps also uses the waters off Camp Pendleton for amphibious warfare-training exercise. In June 2004, the Navy's Advanced Amphibious Assault Vessel (AAAV) ocean training area was extended seaward from 3 NM (4 miles or 6 km) up to approximately 25 NM (29 miles or 46 km) from Camp Pendleton beaches to conduct AAAV over-the-horizon training exercises. This use of the ocean offshore of Camp Pendleton by the Department of Defense could be precluded by the safety zone that would surround the LNG terminal and might also be affected when LNG carriers transit to and from the facility. Therefore, an LNG terminal anywhere within the AAAV ocean training area could disrupt naval exercises, training, and traffic. In 2004, Chevron announced that it was evaluating feasible locations, including offshore of Camp Pendleton, for an LNG facility, in State waters, to serve Southern California. As such, the proposed facility would not be a Deepwater Port Act port. In June 2005, however, Chevron notified public agencies that it did not plan to pursue the project (CEC 2005c).

Further, due to the proposed distance offshore, LNG carriers would have to cross the shipping lanes to reach the LNG terminal; therefore, commercial vessel traffic could be disrupted. Recreational vessel traffic would need to avoid the safety zone. Since the location would be relatively close to shore, it is assumed that the volume of the recreational vessel traffic would be significant; therefore impacts to recreational vessel traffic would be adverse.

This alternative was eliminated from further analysis because of its inability to avoid potential significant environmental impacts, specifically because it is close to shore. In addition, this alternative would involve potentially significant impacts to recreation, visual resources, public health and safety, as well as potential land use conflicts. There would be potentially significant impacts to the Navy's ability to train at Camp Pendleton if an LNG terminal were located within its AAAV ocean training area. Finally, the proposed facility would not have been subject to the provisions of the Deepwater Port Act.

**Offshore of Deer Canyon**

Although a floating terminal approximately 1 mile (1.6 km) offshore of Deer Canyon would be technically feasible, some of the factors that were considered favorable in the 1978 CCC offshore study are no longer favorable. For example, the Santa Monica Mountains were not designated as a national recreation area until later in 1978 (NPS 2002). Moreover, even at the time the study was published, the CCC recognized that there would be significant visual effects on nearby recreation areas, including Leo Carillo and Point Mugu State Parks and the Santa Monica Mountains. Given this location would only be 1 mile (1.6 km) offshore, the facility would be visible from State Route 1 and would pose a potential threat to public safety if an accident occurred. LNG carriers would also have to cross the vessel traffic separation scheme and therefore disrupt coastal recreational and commercial vessel traffic. In addition, the report cited potential conflicts with the Pacific Missile Range Test Center activities and a State oil lease. Currently, there are no known conflicts with the Pacific Missile Range or with a State lease; however, this alternative would have significant aesthetic and recreation impacts.

This potential alternative was eliminated from further consideration in this document because it would result in potentially significant effects on aesthetic, public safety, marine traffic, and recreation. Potential sites further than 1 mile (1.6 km) offshore of Deer Canyon, but landward of the vessel traffic separation scheme, would have similar adverse effects. Moving further from shore would decrease the aesthetic, marine traffic, and recreational impacts but would increase the potential interference with commercial vessel traffic.

**Offshore of Chinese Harbor, Smugglers Cove, San Pedro Point, and Bechers Bay**

The Chinese Harbor, Smugglers Cove, and San Pedro Point locations are offshore of Santa Cruz Island, and the Bechers Bay location is offshore of Santa Rosa Island. All of these sites are considered unacceptable because of their location within the Channel

Islands National Park (CINP) and National Marine Sanctuary, established in 1980[2], and the biological significance of the surrounding resources (NOAA 1983).

Certain provisions of Title 36, CFR), Parks, Forests, and Public Property, Chapter 1, Parts 1–7, authorized by Title 16 United States Code, § 3 apply to all lands and waters administered by the NPS within the boundaries of the CINP. These provisions are intended to conserve the sensitive marine organisms and other resources that occur in nearshore waters of the CINP. Enforced restrictions include limits on marine vessel traffic and public use, special area closures, and designations for specific uses or activities (NPS 2004).

Approval of an LNG facility in these locations is highly unlikely because it would conflict with the national park's or sanctuary's intended land use. Therefore, these potential alternatives were eliminated from further consideration.

**Anacapa**

The Anacapa alternative location was proposed by the Applicant and is approximately 14 NM (16 miles or 26 km) offshore of Point Mugu and approximately 9.5 NM (11 miles or 17.6 km) from Anacapa Island, which is part of the CINMS (see Figure 3.3-1, above). Like the other locations located within CINMS, approval of an LNG facility is unlikely because it would conflict with the sanctuary's intended land use. Therefore, this potential alternative was eliminated from further consideration because it is not feasible.

**West Side of the Channel Islands**

During the public scoping period, a commenter suggested the west side of the Channel Islands as an alternative location for the DWP (see Figure 3.3-1, above). This alternative was considered, but not retained for full analysis because it is infeasible primarily because it would be located within the CINMS. In addition, water depths on the west side of the Channel Islands are greater than those of the proposed Project mooring location, slopes are steep (which would make it difficult to delineate a submarine pipeline route from this location to the shore), and wind/wave conditions can be severe. Also, depending on the location, operations of an FSRU on the west of the Channel Islands, where the Navy conducts exercises, could interfere with Naval activities This area is also along whale migration routes. Therefore, this potential alternative was eliminated from further consideration because it is not feasible.

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[2] Channel Islands National Park (CINP) was established in 1980 by Public Law 96-199. The waters within 6 NM (6.9 miles or 11.1 km) of the northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa Islands) and Santa Barbara Island were formally designated as a national marine sanctuary in 1980 in accordance with Title III of the Marine Protection, Research, and Sanctuaries Act. The sanctuary lies between 8 and 40 NM (9.2 and 46 miles, or 14.8 and 74 km) off the Southern California mainland, north of Los Angeles and immediately south of the Santa Barbara Channel (NPS 2003).

### 3.3.8 Alternative Deepwater Port Concepts

DWP technology concepts that were considered as potential alternatives but eliminated from further consideration are a fixed offshore LNG terminal, a gravity-based structure, and single and multiple mooring direct regasification. The reasons for their elimination are detailed below.

#### 3.3.8.1 Fixed Offshore Liquefied Natural Gas Terminal Alternatives

There are two possible platform-based LNG terminal alternatives: use of an existing oil platform or construction of a new platform. Descriptions of these alternatives and the reasons for their elimination from further consideration are provided below.

**Existing Platform-Based Terminal Alternative**

One fixed terminal alternative would reuse an existing offshore oil platform. Currently, there are 27 oil and gas production platforms operating in Federal or State waters in the Santa Barbara Channel, Santa Maria Basin, and offshore of Los Angeles/Long Beach.

Offshore oil platforms can be used only for the intended use for which they were permitted. Altering or converting the function of an offshore oil platform for either exclusive use as an offshore LNG terminal or dual use as an offshore LNG terminal and oil and gas production facility requires a new Development and Production Plan for that platform, approved by the U.S. Department of the Interior, Minerals Management Service. Converting an operating oil or gas platform to a different type of facility than originally permitted can be costly and time consuming. This process has never been successfully undertaken.

Currently, most offshore oil platforms are more than 20 years old. These platforms were not built to berth LNG carriers or support ancillary equipment. A comprehensive structural analysis would be needed in order to determine if a platform were sufficiently structurally sound to extend its lifespan and to support a deepwater port for LNG. The addition of berthing capability to the platform would also create a larger object in the viewshed and would extend the life of an existing, perceived adverse visual effect.

An LNG terminal at an offshore oil platform would not have sufficient storage capacity to meet the objective of the proposed Project. It would likely be a single-point mooring direct regasification facility similar to the proposed Crystal Energy project. As stated in Chapter 1.0, "Introduction," one purpose of the Cabrillo Port Deepwater Port is to provide additional storage capacity of natural gas. Therefore, the type of LNG facility associated with an offshore oil platform would not meet the purpose of the proposed Project. The potential existing platform-based terminal alternative was eliminated as an alternative to the proposed Project because it would not accomplish most of the objectives and purposes of the proposed Project and does not provide storage capacity, and because sufficient information is not available to analyze it to the same level of detail as the proposed Project.

A proposal by Crystal Energy to construct an offshore LNG terminal at Platform Grace will be evaluated in a separate EIS/EIR. Its intended purpose would be to meet only spot-market natural gas demand and it could not provide a consistent supply of natural gas. Since it could be licensed and could operate simultaneously with Cabrillo Port, it is appropriate to evaluate its potential effects within the context of cumulative impacts (see Section 4.20, "Cumulative Impacts Analysis").

**New Fixed Platform-based Terminal Alternative**

As discussed above, a platform-based terminal could be designed to receive and regasify LNG and send the natural gas to shore via a pipeline; however, it would be technically infeasible to consider placing a platform at the same location as that of the proposed Project because, to date, fixed platforms have not been installed at the ocean depth of the proposed DWP location (approximately 2,900 feet [884 m]). To date, fixed platforms have been installed to water depths of 1,353 feet (412 m). Compliant (flexible) pile and compliant or guyed platforms have been installed in water depths to 1,753 feet (534 m). Only floating facilities have been installed to greater depths (Offshore Magazine 2005).

Given the level of public opposition to the existing platforms in the Santa Barbara Channel, an equivalent or greater level of opposition to any new proposed platform would be anticipated. A new platform would have not only visual effects for those who live in and use the viewshed, but also greater potential environmental effects than conversion of an existing platform, since the impacts associated with installation of existing platforms have already occurred.

A fixed platform-based LNG terminal would also have to be constructed closer to shore than the proposed Project location. If one were installed closer to shore within feasible water depths, the platform could create an additional navigational hazard in the Santa Barbara Channel, and the necessary exclusion zone would affect many maritime commercial and recreational activities because it would be in a high vessel-traffic area. Given that a new platform would be fixed to the seafloor, the potential adverse effects of local seismic activity to the structure would be greater than the effects to a floating facility. Given that the potential environmental and safety effects would be greater than those of the proposed Project, this alternative was eliminated from further evaluation in this document.

#### 3.3.8.2 Gravity-Based Structure

An additional alternative offshore concept is a fixed LNG terminal, such as a gravity-based structure. A gravity-based structure is one that remains secured to the seafloor, primarily by gravity. A gravity-based structure can be constructed onshore (usually from concrete), floated to a site, and installed to provide an offshore enclosure and foundation for LNG tanks and a stable deck for regasification equipment. Such a facility could be placed on a level and stable part of the seabed. Factors influencing this concept include constructability, weather, safety, shipping, environmental setting, geology of the seabed (including water depth), and regulatory permitting.

Gravity-based structures are not suited to the water depth at the proposed DWP (approximately 2,900 feet [884 m]), and therefore would have to be located closer to shore. The deepest concrete deep water structure is the Troll A platform in the North Sea, which is installed in 1,148 feet (350 m) of water (Norske Shell 2006). It is not an LNG facility. In general, gravity-based structures are more economical in waters deeper than 100 feet (30.5 m). The LNG facility initially proposed offshore Camp Pendleton, entirely within State waters, was a gravity-based structure.

This potential alternative terminal technology was eliminated from further consideration because of the technical infeasibility of installing it at the location of the proposed Project or any other location with similar attributes, e.g., distance from shore, and because a location closer to shore would pose greater visual effects and potential marine traffic issues than the proposed Project.

### 3.3.8.3 Floating Offshore Liquefied Natural Gas Terminal

#### Single-Point Mooring Direct Regasification

The single-point mooring direct regasification concept was considered, but eliminated as an alternative because it does not serve the purpose and need of the proposed Project.

The basis of this system is a single submerged turret loading buoy moored to the seabed that remains submerged 82 to 131 feet (25 to 40 m) below the water surface. When an LNG carrier with the proper fittings approaches the buoy location, the LNG carrier retrieves the buoy into a mating cone in the bottom of the vessel. Within the buoy is a turret with a connection to the mooring and riser system, i.e., pipeline manifold on the seafloor. The outer portion of the buoy hull rotates freely. Currently, these systems operate in 279 to 1,148 feet (85 to 350 m) water depth with significant wave heights of 53.8 feet (16.4 m). Ocean basin tests have verified the feasibility of these types of mooring systems for water depths ranging from 131 to 2,958 feet (40 to 900 m). Operational oil submerged turret systems have eight to 12 mooring legs and are anchored either by piles, suction, or drag anchors (APL 2005). Cabrillo Port would be moored with nine drag anchors; therefore, the seabed footprint of a single-point mooring system could be slightly smaller or larger than that of Cabrillo Port.

With a submerged turret loading technology, specially designed LNG carriers with onboard regasification equipment are required. After mooring, the LNG carrier would regasify the LNG onboard and send the natural gas through the mooring point via a flexible riser to a subsea pipeline. Regasification of the entire LNG cargo of approximately 3 billion cubic feet (85 million $m^3$) of natural gas would take six to seven days (Bryngelson 2004).

One example of this DWP concept would use a flow-through, single-point mooring such as that installed for the Excelerate’s Gulf Gateway Energy Bridge DWP (formerly El Paso Energy Bridge Gulf of Mexico), which began operation in March 2005 (see Figure 3.3-2). For this deepwater port, a “shell and tube” regasification technology was used, in which multiple smaller-diameter tubes are housed in a larger tube that acts as a shell. LNG is transported through the smaller tubes and water flows through the larger tube, allowing heat transfer between the two fluids separated by the tube wall.

For the shell and tube technology, either a once-through heating water (open loop) vaporization technology or a steam-heated (closed loop) system is used. Excelerate's Gulf Gateway Energy Bridge operates using both technologies. In the open-loop configuration, the LNG carrier would pump seawater from intakes on the ship's hull below the waterline. The seawater is the heat source to warm the LNG. The seawater travels through the shell-and-tube vaporizer to change the natural gas in its liquid form (LNG) into a gas. The open loop system can only operate at water temperatures of 42°F (5.5°C) or higher.


*Source*: Excelerate Energy 2004.

**Figure 3.3-2 Example of an Energy Bridge Terminal**

The negative environmental consequences of the open loop system include substantial seawater intake and discharge. An open loop system would require a daily intake of 76.1 million gallons (288,000 $m^3$) per day of seawater to provide a supply of 500 MMcf (14.2 million $m^3$) per day. Seawater that has passed through the open loop shell-and-tube system would be discharged at a temperature 13.5°F (10.3°C) lower than the temperature at which it entered the system (USCG 2003). The intake of seawater could cause the impingement and entrainment of fish eggs or larvae. The discharge of relatively cooler water could have an adverse effect on marine biota in the immediate vicinity of the discharge.

For Excelerate's Gulf Gateway project, seawater passes through a copper cathode antifouling system to prevent the fouling of shipboard equipment and to prevent the establishment of marine biota along the seawater pathway. Small concentrations of copper can be released in this process. As a condition of its license, Gulf Gateway must turn off the copper antifouling system while the regasification vaporizers are operating in the open-loop warm water mode. The approximate concentration of the copper in the discharge would be 2 parts per billion (USCG 2003).

In contrast, in the closed loop system the propulsion boilers would heat water that would circulate through the shell-and-tube vaporizer to heat the LNG. After heating the LNG in the shell-and-tube vaporizer, the water would circulate through the steam heater to rewarm the water and then recirculate through the shell-and-tube vaporizer (USCG 2003). The closed loop system does not use seawater and therefore does not have the impacts on water quality or marine biological resources that an open loop system has. However, because the closed loop system on Excelerate's Gulf Gateway project has to use two boilers and a diesel generator for the regasification of LNG in contrast to the one boiler needed to operate during the open loop system, additional air emissions are generated. As shown in Table 3.3-2, air emissions for the closed loop system are significantly higher than the open loop system. With respect to potential adverse impact to water and air quality associated with regasification, this technology increases, not avoids, potential environmental impacts.

**Table 3.3-2 Estimated Regasification Related Air Emissions of Excelerate's Gulf Gateway Project and the Proposed Cabrillo Port Project**

| | Nitrogen Oxides | Carbon Monoxide | Sulfur Dioxide | Particulate Matter | Volatile Organic Compounds |
|---|---|---|---|---|---|
| **Estimated Annual Emissions for Excelerate's Gulf Gateway Project Based on Operations for 8,760 Hours per Year (in tons per year)** | | | | | |
| Open loop | 178 | 82 | 1 | 9 | 9 |
| Closed loop | 833 | 268 | 329 | 30 | 28 |
| **Estimated Annual Emissions for the Proposed Cabrillo Port Project (in tons per year)** | | | | | |
| FSRU stationary sources | 67.1 | 169.0 | 0.4 | 11.7 | 24.8 |

*Sources*: USCG 2003; Sierra Research 2005.

An objective of the proposed Project is to develop a DWP that would provide sufficient natural gas storage capacity to enable a continuous, reliable supply to local energy markets. The single-point mooring system alternative cannot fulfill this objective. The single-point mooring concept is designed only to meet intermittent market demand. It only can provide natural gas when an LNG carrier with regasification technology is berthed. If weather prevents an LNG carrier from berthing, no natural gas could be supplied. Table 3.3-3 provides a comparison of the two systems.

According to the environmental assessment of the license application for Excelerate's Gulf Gateway Energy Bridge DWP (USCG 2003), a single LNG carrier can transport a maximum of 36.4 million gallons (138,000 $m^3$) of LNG and requires approximately six to seven days to unload and regasify. In contrast, the proposed FSRU has a storage capacity of 72 million gallons (273,500 $m^3$) and all the gas is readily available at any

**Table 3.3-3 Comparison of the Proposed Cabrillo Port FSRU to an Energy Bridge Alternative**

| Alternatives | Cabrillo Port FSRU | Energy Bridge |
|---|---|---|
| *General Characteristics* | | |
| Unit description | Permanently moored FSRU | LNG carrier with onboard regasification unit and submerged turret loading system. |
| LNG storage capacity | 72 million gallons (272,500 $m^3$). | 36.5 million gallons (138,000 $m^3$) |
| Regasification | Submerged combustion vaporizers with natural gas as fuel. | Shell and tube heat exchanger with heat source, either sea water (open loop) or gas burner heating (closed loop). |
| Maximum regasification capacity | 1,500 MMcf (42.5 million $m^3$) per day of gas | Individual unit, either 690 MMcf (19.5 million $m^3$) per day of gas open loop, or 450 MMcf (12.7 million $m^3$) per day of gas closed loop. |
| Tank system | Moss aluminum spherical | Membrane or spherical |
| Offloading/marine operation | Side-by-side loading | Connecting and disconnecting to/from single submerged turret loading buoy |
| Length of time for unloading (days) | One | Six to seven |
| Compatibility with LNG carriers | Compatible with all LNG carrier types | Can only receive carriers with regasification capacity |
| *FSRU and Triple-point Mooring Buoy System* | | |
| Number of units needed to provide continuous 800 MMcf (22.7 MMcf per day of gas) | One | Two Energy Bridge type vessels on moorings at all times; one vessel nearby transiting most all of the time. |
| Environmental footprint | One unit and one mooring and riser system plus carriers. Surface footprint = about a 2-mile (3.2 km) radius from mooring point. Subsea footprint = one mooring system, risers, PLETs, and PLEM. | Two units plus thee mooring and riser systems plus carriers. Surface area = approximately 6.5 miles (10.5 km) by 2.0 miles (3.2 km) inclusive of safety zones and Areas to Be Avoided), depending on the configuration of the buoys. Subsea area = three mooring systems, risers, PLETs, and PLEM. |
| Visual impact | One unit always present | Two units always present |

*Notes*: MMcf = million cubic feet; PLETs = pipeline end terminations; PLEM = pipeline-ending manifold.

time. In addition, the relatively large number of traditional LNG carriers that could call at the FSRU (165 with an additional 85 on order) adds to the reliability, in contrast to the few specifically designed LNG carriers (only one is currently operational) equipped to regasify on board. The single-point mooring DWP concept can neither meet the objective of a continuous supply of natural gas nor result in lesser environmental impacts; therefore, is not a feasible alternative to the proposed Project.

**Multiple-Point Mooring Direct Regasification**

Another DWP concept is the multiple-point mooring system. The technology would be the same as the single-point mooring system, but a multiple-point mooring system would have multiple separate buoys. The purpose of this system would be to provide continuous service at the same capacity as the FSRU. In order to have comparable capacity as the FSRU, a three-buoy system would be needed, based on the current size of LNG regasification carriers of 36.4 million gallons (138,000 $m^3$). Two LNG regasification carriers would need to moor and regasify simultaneously in order to achieve a comparable daily natural gas delivery rate as the FSRU. When one LNG carrier finishes regasifying its cargo, a third LNG carrier would moor at the third buoy. Once the first LNG carrier has departed, the third carrier would begin its delivery of natural gas. This would ensure a continuous supply of natural gas at the same rate of delivery as the FSRU.

This system would require three separate subsea mooring systems that would include a flexible riser, subsea manifold, and multiple anchor lines to anchor the docking buoy. Aside from the docking buoy, the subsea system would be very similar to the system proposed for Cabrillo Port; however, the subsea footprint would be three times the size and therefore, potentially greater impacts to the subsea environment. A comparison of two systems is provided in the lower half of Table 3.3-3.

For Cabrillo Port, LNG carriers would dock and unload LNG for 16 to 22 hours and then leave. Two to three LNG carriers would dock and unload at Cabrillo Port weekly. In contrast, since the LNG carriers for the mooring buoy system must regasify the LNG, a carrier would remain docked for six to seven days to discharge its cargo and one would always be operating at two of three buoys.

A 0.27 NM (0.3 mile or 0.5 km) radius safety zone would be required for each mooring turret. Unauthorized vessels would not be allowed to enter the safety zones. In addition, an Area to Be Avoided (ATBA) would probably be established around each turret or around the entire mooring system. Vessels could enter the ATBA, but the recommended maximum speed would 10 knots (11.5 mph or 18.5 kph). The size of the ATBA would be determined at the time of licensing, but an ATBA for a DWP could range from a radius of 0.54 NM to 1.6 NM (0.6 to 1.8 miles or 1 to 3 km). Excelerate's Gulf Gateway project has a 0.27 NM (0.3 mile or 0.5 km) safety zone, a 0.8 NM (0.9 mile or 1.5 km) no anchoring zone, and a 1.1 NM (1.3 miles or 2 km) ATBA. Cabrillo Port would have only one safety zone/ATBA; the entire area surrounding Cabrillo Port that would have safety restrictions would likely be one-third of the size of the area for a triple-point mooring system. Therefore, the triple-point mooring system would have greater impacts to recreational and commercial vessels use in the area and potentially greater impacts to marine traffic.

Although the triple-point mooring system would have the capability of providing a continuous supply of natural gas, it would have the same type of environmental issues as the single-point mooring regasification system. That is, if the open loop system were used, it could adversely impact fish eggs, larvae, and other marine biota due to the discharge of relatively cooler water. If the closed loop system were used, emissions from the triple-point mooring system would be greater than those estimated for Excelerate's Gulf Gateway project because two LNG carriers would be operating simultaneously. Therefore, air emissions would likely be greater than Cabrillo Port's.

Depending on whether an open loop or closed loop regasification system were used, either impacts to marine biota or air emissions would be greater than Cabrillo Port's impacts; the seabed footprint would be three times that of Cabrillo Port; and the area with access restrictions and/or recommended speed limits would be twice Cabrillo Port's area. Therefore, a triple-point mooring was eliminated from further consideration because it would have a greater subsea footprint, would require LNG carriers to be docked at the DWP most of the time, and would increase, rather than avoid, potential significant environmental impacts.

### 3.3.9 Alternative Technologies

#### 3.3.9.1 Alternative Vapor Technologies

All vaporizer technologies involve pumping LNG through a heating medium where the LNG absorbs heat and is vaporized into natural gas. Two proven alternative technologies are the intermediate fluid vaporizer and the open-rack vaporizer. Although these alternatives would have lower air emissions of nitrogen oxides and carbon dioxide compared with submerged combustion vaporization, both were eliminated from further consideration due to other disadvantages discussed below.

The open-rack vaporizer technology is not compatible with a floating facility because it requires a stable platform in order to provide a uniform flow of water over the heat exchanger tubes. The flow of water is similar to a waterfall. Movement of the FSRU during expected ocean conditions and the resultant motion of the open-rack vaporizer would cause inconsistent downfall of the water onto the vaporizer tubes. Motion of the FSRU may cause water in the open rack to slosh around, disrupting the vaporization process and creating cold spots. The temperature of the seawater at the proposed Project location also may not be optimal for use in an open-rack system. Additionally, there are greater impacts on marine biota, e.g., entrainment, that result from the intake of seawater as a heating medium.

Intermediate fluid vaporizers would require the use of propane or other intermediate heating fluids such as a water/glycol mixture. The physical properties of propane are such that it has the potential to explode in unconfined conditions; therefore, its use would introduce an additional element of risk at the FSRU. This alternative would have fewer emissions than a submerged combustion vaporizer; however, intermediate fluid vaporizers would require additional electrical power generation capability.

The open-rack and intermediate vaporizer technology alternatives would require intake of more than 50 million gallons (189,250 $m^3$) of seawater per day and would require larger deck space on the FSRU than submerged combustion vaporizers. Seawater would flow through the vaporizers and return to the ocean at a lower-than-ambient temperature. Sensitive marine resources could be adversely affected through entrainment and impingement, cold-water discharges, discharge of treated water, and noise. The water intake would also require onboard pumps, which would generate noise audible above and below water that could disturb marine mammals that migrate in this area. In addition, maintenance of the water intake filter and piping would require the use of antifouling chemicals, which are hazardous. Discharge of these chemicals would adversely affect marine organisms.

The open-rack vaporizer and intermediate fluid vaporizer technologies would be anticipated to have a greater effect on marine biota in the area compared to submerged combustion vaporization. Also, an open-rack vaporizer may not be feasible on a floating facility. As a result, both open-rack vaporizer and intermediate fluid vaporizer technologies were eliminated from further consideration as alternative regasification processes.

#### 3.3.9.2 Alternative Membrane-Type LNG Storage Technology

An alternative to a Moss tank, which the proposed Project would use, is a membrane-type storage tank. Membrane-type storage tanks are built into the inner ship hull. FSRU tanks operate at variable LNG levels, depending on whether they are receiving, holding, or sending out LNG.

For the purposes of this DWP application, MARAD does not have a predisposition toward any of the alternative LNG storage technologies. Instead, MARAD allows the LNG industry to initially determine the appropriate technology to safely and reliably serve its intended business purposes. MARAD believes that any of these technologies can be acceptable in terms of safety, operability, availability, and environmental protection, as long as they meet the requirements of 33 CFR Part 149. Therefore, MARAD will evaluate the merits of each application on a case-by-case basis and require each applicant to provide a rational and objective analysis of alternative LNG storage technologies. Pursuant to 33 CFR Part 149, the USCG will review, approve, and comment on all plans and specifications (including proposed standards and "design based" methodology that will be used for innovative technologies). If the Cabrillo Port license is approved, or approved with conditions, the USCG would conduct a detailed study regarding all design and construction plans in accordance with Navigation Vessel and Inspection Circular 03-05, "Detailed Plan Review."

Because the Moss tank LNG storage technology has been found acceptable in terms of safety, operability, availability, and environmental perspectives, MARAD's screening has found no compelling reason to reject it as the preferred component of the proposed

Project. Accordingly, the use of a membrane-type storage tank has been eliminated from further analysis.

#### 3.3.9.3 Alternative Onshore Power Source

Powering the FSRU through the use of a power cable extending from an existing onshore power plant is technically feasible; however, it would not be environmentally preferred. First, shore-side power plants would need to increase their output to meet the FSRU's electrical needs; therefore, emissions would be generated onshore in an area that does not fully comply with air quality standards, e.g., a non-attainment area. Second, the power plants would have to generate even more electricity to compensate for the energy lost during the transmission and transformation of the electricity in the cable; therefore, even more emissions would be generated. The net increase in emissions over those that would be generated by the proposed Project at the offshore location makes this alternative less environmentally preferable; therefore, this alternative was not retained for further evaluation.

#### 3.3.9.4 Alternative Diesel Engine Cooling Technology

Alternative diesel engine cooling technology was not evaluated because no other technology to cool the diesel generators is currently commercially available.

### 3.3.10 Alternative Offshore Pipeline Routes

Three offshore pipeline route alternatives between the Applicant's proposed mooring point for the FSRU and the proposed shoreline crossing at Ormond Beach were evaluated, but were eliminated from further consideration. Another offshore pipeline route was considered from the proposed FSRU to Mandalay Beach. These alternative pipeline routes are discussed below. A fifth route, associated with an alternative mooring location, has been retained for further consideration and is described in Section 3.4.2, "Alternative Deepwater Port, Subsea Pipeline, Shore Crossing, and Onshore Pipeline Location – Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline Alternative."

Figure 3.3-3 shows the offshore and onshore topography of Southern California. Constraints that were considered in evaluating offshore pipeline routes include seafloor topography and whether the seafloor is hard-bottom or sandy. Ideally, offshore pipelines should lay on flat or gently sloping sandy seafloors with a minimum of seismic activity. In selecting a pipeline location, the shore crossing location had to be considered. Shore crossings should also be near existing infrastructure. As shown, the location of offshore pipelines is constrained by the presence of deep canyons, including Hueneme and Mugu Canyons.

#### 3.3.10.1 Alternative Offshore Pipeline Route 1

It should be noted that Alternative Offshore Pipeline Route 1 was the proposed Project's offshore route in the October 2004 Draft EIS/EIR. This route would run west from the pipeline-ending manifold (PLEM) between two canyons to the shore crossing and would cross three telecommunication cables—two surface-laid U.S. Navy cables (FOCUS and RELI) and one potentially buried telecommunications cable (Global West Segment F). This route would cross the Global West and U.S. Navy Focus cable at approximately the location that these cables cross near the center of the Southbound Coastwise Shipping Lane. This pipeline route would traverse through the center of the U.S. Navy's undersea cable area between two subsea canyons until it crosses the U.S. Navy RELI cable as it approaches the shore. The total length of Alternative Offshore Pipeline Route 1 would be 21.5 miles (34.6 km), approximately 0.65 mile (1 km) shorter than the proposed Project.

This alternative was eliminated based on the Applicant's seismic design analysis and review, which indicated that there was greater potential for tubidity flows along this pipeline route.

#### 3.3.10.2 Alternative Offshore Pipeline Route 2

Alternative Route 2 would run west of the proposed pipeline route and west (as much as possible) of both Navy cables and their safety corridor. From there, the route would run toward the Navy cable corridor across a relatively featureless seabed. At approximately 0.5 mile (0.8 km) of water depth, the route would head northwest and enter the Navy cable corridor. To ensure compliance with the anticipated Navy engineering requirements, this section of the route would cross the RELI and FOCUS cables with an angle as close as possible to 90°.

At approximately 0.4 mile (0.6 km) of water depth, the route would leave the Navy cable corridor and enter Hueneme Canyon, not always perpendicularly to the slope, to a water depth of approximately 984 feet (300 m). Slope gradients in this area are likely greater than 10° in places. For this reason, and because studies have shown that the canyon is still active and may be affected by slope failure, slides, and turbidity currents (particularly in an earthquake), the pipeline would likely be at greater risk in this area. Therefore, this alternative route was eliminated from further consideration.

#### 3.3.10.3 Alternative Offshore Pipeline Route 3

Alternative Offshore Pipeline Route 3 would avoid the Navy cable corridor as much as possible by staying east of the Navy cables, except for the crossing point. From the mooring point, the route would run northwest for approximately 4 miles (6.4 km), then north. The route would cross the Global West cable at a water depth of approximately 0.5 mile (0.8 km). It would then climb up the continental slope in an area with maximum gradients of approximately 6° and along a smooth and wide ridge between Mugu Canyon and a smaller channel to the west. In the upper part of the slope, between 131 and 197 feet (40 and 60 m) of water depth, the route would pass 0.4 to 0.5 mile (0.6 to 0.8 km) east of a buoy-testing area. It would then turn west to cross the Navy cable corridor and avoid the head of Mugu Canyon. Alternative Offshore Pipeline Route 3 would run between the two navigation buoys, through the Navy cable corridor, and across the RELI and FOCUS cables. This route would cross the Navy cables where they have been buried to 1 to 2 feet (0.3 to 0.6 m).

Insert (1 of 2)

**Figure 3.3-3 Regional Topography**

Insert (2 of 2)

Figure 3.3-3 Regional Topography

The total length of Alternative Offshore Pipeline Route 3 would be 20.9 miles (33.6 km), which is 1.25 miles (2 km) shorter than the proposed route. This route would run parallel to the beach and in shallow waters over a distance of approximately 2.5 NM (2.9 miles or 4.6 km). At this depth, the pipeline would likely be exposed to wave surge during large storms. Running parallel to the shoreline would exacerbate this hazard. In addition, the route would run relatively close to the head of Mugu Canyon, which is potentially seismically active, particularly during flooding and strong storms. For these reasons, Alternative Offshore Pipeline Route 3 was eliminated from further analysis.

#### 3.3.10.4 Mandalay Pipeline Alternative

The Mandalay Pipeline Alternative would extend northwest from the FSRU, cross Hueneme Canyon, and continue north for a shoreline crossing at the Reliant Energy Mandalay Generating Station (see Figure 3.3-1, above). This alternative pipeline route would have to cross through waters offshore of Port Hueneme. During pipeline construction and any potential repairs, vessel traffic at Port Hueneme would have to be curtailed, which would have significant implications for vessel traffic and safety and the economic welfare of Port Hueneme. This alternative pipeline route would not avoid or lessen significant marine traffic and socioeconomic effects identified for the proposed Project and was therefore eliminated from further consideration.

### 3.3.11 Alternative Pipeline Shoreline Crossing Technologies

Horizontal directional boring (HDB), the methodology proposed by the Applicant, horizontal directional drilling (HDD), and trenching methods can be used for crossing of the shoreline by pipelines. The HDB construction process is described in Section 2.6.1, “Shore Crossing via HDB.” Both HDB and HDD involve use of a drill rig that drills a borehole from onshore to a predetermined exit hole in the ocean floor offshore. The borehole is then reamed to increase its diameter. The pipeline can then either be pulled from shore through to the exit hole, using barge-mounted pulling equipment, or can be pulled back from the barge to the onshore drill site, using onshore pull-back equipment. The pulling operation is continuous to minimize the chance of hole collapse. The Applicant has chosen not to use the HDD method because there is a greater chance of a potential “frac-out.” A frac-out is an accidental release in which drilling mud escapes from the borehole through fissures and cracks in the surrounding medium into the environment. Frac-outs are much less likely to occur when using HDB because the drilling mud is only under minimal pressure. HDD has been eliminated as a potential shore crossing alternative because it a greater potential to cause adverse effects to the marine environment than does HDB.

In trenching, heavy equipment is used to dig the appropriately sized trench for the length of a pipeline route, and any biota living within the construction corridor of the trench could be crushed, buried, or dislodged. The shoreline at any of the proposed shore crossing alternatives has the potential to contain special status species. Trenching would have much greater impacts on the surrounding environment than either HDB or HDD because the impacts from HDB and HDD are limited to the entrance and exit hole staging areas. Based on the known effects of trenching, it has been eliminated as a shore crossing technology because it would increase rather than avoid or lessen the potential significant environmental effects identified for the proposed Project.

#### 3.3.12 Alternative Onshore Pipeline Locations

The Applicant originally considered four alternative pipeline routes to connect the shore crossing with the Center Road Station; however, in response to scoping and public comments on the October 2004 Draft EIS/EIR, onshore pipeline routes have been added. The EIS/EIR Project team eliminated Alternatives 1A and 1B from further consideration, as discussed below. Analyses of Center Road Pipeline Alternatives 1, 2, and 3 can be found in Section 3.4.4, "Alternative Onshore Pipeline Routes." The Applicant also considered a second alternative to the Line 225 Loop Pipeline, discussed below.

In response to scoping comments, the Applicant modified the proposed Center Road Pipeline route that was described in its application. As a result of concerns raised during public comment on the October 2004 Draft EIS/EIR, the Applicant further modified the northern end of the proposed Center Road Pipeline route to avoid a school (see Section 2.4.1.1, "Center Road Pipeline"). The former proposed Center Road Pipeline route is now Center Road Pipeline Alternative 3 (see Section 3.4.4.3).

##### 3.3.12.1 Center Road Onshore Alternative Pipelines 1A and 1B

Both Alternatives 1A and 1B would follow existing utility rights-of-way (ROWs), public roads, and/or newly acquired easements. Alternative 1A would:

- Begin at the new metering station adjacent to the Reliant Energy Ormond Beach Generating Station shore crossing and then run northeast and north along a SoCalGas and SCE ROW and then northeast on Pleasant Valley Road past Rice Avenue about 0.8 mile (1.3 km) to approximately MP 4.3 where the route turns north;
- Continue north through agricultural fields and cross East 5$^{th}$ Street and a parallel railroad ROW, then continue north along Del Norte Boulevard;
- Continue to follow Del Norte Boulevard to the on-ramp for U.S. 101, then turn east and parallel the highway about 0.3 mile (0.5 km) and then cross the highway heading northeast (parallel to Santa Clara Avenue);
- At Central Avenue, turn right (southeast) and travel to Beardsley;
- Then travel about 0.25 mile (0.4 km) northeast along Beardsley, at which point the route turns north-northwest and traverses open agricultural land (adjacent to the Santa Clara Diversion flood control channel) to Santa Clara Avenue at a point about 0.25 mile (0.4 km) southwest of the intersection with Wright Road;
- Follow Santa Clara Avenue northeast and then continue northeast at Los Angeles Avenue, north at La Vista Avenue, and west at Center Road; and

- Terminate at the Center Road Valve Station.

Alternative 1B would combine the existing ROWs along Route Alterative 1A with the proposed route. Alternative 1B would:

- Begin at the new metering station adjacent to the Reliant Energy Ormond Beach Generating Station shore crossing and then run northeast and north along a SoCalGas ROW, northeast on Pleasant Valley Road, and then north on Rice Avenue;
- Proceed from Rice Avenue east on Sturgis Road and north on Del Norte Boulevard to U.S. 101; and
- Follow the same route as Alternative 1A from U.S. 101 to the pipeline termination point at the Center Road Valve Station.

Alternatives 1A and 1B presented significantly more potential adverse safety, traffic, and environmental justice effects than the proposed route. Alternative Routes 1A and 1B would pass in front of at least five schools and one residential care facility and would traverse the most densely populated area along any of the proposed routes. Construction in the residential areas and in front of the schools and residential care facilities would temporarily increase traffic congestion, noise, and air pollution (particulates), for a larger population than would the proposed route. A higher proportion of lower-income and minority populations would also be affected. Because neither route avoids or lessens adverse effects identified for the proposed Project, Alternatives 1A and 1B were eliminated from further consideration.

#### 3.3.12.2 Line 225 Loop Pipeline Alternative 2

The Applicant considered an alternative route that would extend from the Quigley Valve Station and terminate at the Saugus Valve Station instead of continuing on to the Honor Rancho Valve Station. This alternative would follow the proposed Line 225 Loop Pipeline route from the Quigley Valve Station to MP 5.39, where it would terminate at the Saugus Valve Station. This alternative was determined to be infeasible because it could not accommodate the total volume of gas to be delivered. The Applicant proposes to deliver an average of 800 MMcf (22.7 million $m^3$) per day of natural gas. In testimony before the CPUC on December 2, 2004, David Bisi, a representative from SoCalGas and the San Diego Gas and Electric Company, outlined the necessary expansions to the SoCalGas receiving facilities that would be needed to accommodate additional capacity (Bisi 2004). To accommodate more than 800 MMcf (22.7 million $m^3$) per day, SoCalGas would need to complete the following system improvements that are relevant to this Project:

- New pipeline to the Center Road Station;
- Improvements at the Center Road Station;
- Loop Line 225, Saugus Valve Station to the Quigley Valve Station; and
- Loop Line 225, the Saugus Valve Station to the Honor Rancho Valve Station.

Because SoCalGas requires system improvements from the Saugus Valve Station via the Quigley Valve Station to the Honor Rancho Valve Station to accommodate 800 MMcf of natural gas and those would not be completed under this alternative, this alternative was determined to be infeasible and was not carried forward for further analysis.

## 3.4 ALTERNATIVES EVALUATED IN CHAPTER 4.0

The alternatives that were retained for analysis are the following:

- No Action Alternative (no project);
- Alternative DWP, subsea pipeline, shore crossing, and onshore pipeline locations;
- Alternative shore crossings; and
- Alternative onshore pipeline routes.

These alternatives are evaluated in the each resource section in Chapter 4.0, “Environmental Analysis.”

### 3.4.1 No Action Alternative

This document refers to the continuation of existing conditions of the affected environment, without implementation of the proposed Project, as the “No Action Alternative,” which is used herein as inclusive of the CEQA term, “No Project Alternative.” Inclusion of the No Action Alternative is prescribed by the Council on Environmental Quality (CEQ), NEPA regulations, and the USCG NEPA implementation guidelines, the CEQA, and the State CEQA Guidelines and serves as a benchmark against which Federal and State actions can be evaluated. Under the No Action Alternative, MARAD would deny the license for the Cabrillo Port Project and/or the CSLC would deny the application for the proposed lease of State tide and submerged lands for a pipeline right-of-way. The No Action Alternative means that the Project would not go forward and the FSRU, associated subsea pipelines, and onshore pipelines and related facilities would not be installed. Accordingly, none of the potential environmental impacts identified for the construction and operation of the proposed Project would occur. Since the proposed Project is privately funded, it is unknown whether the Applicant would fund another energy project in California.

If the No Action Alternative were chosen, the energy needs identified in Section 1.2, "Project Purpose, Need and Objectives," would likely be addressed through other means. Considering the projections regarding California’s future energy needs contained in the CEC’s 2005 Integrated Energy Policy Report Committee Final Report and CEC’s and the CPUC’s Energy Action Plan II, Implementation Road Map for Energy Policies, the No Action Alternative could result in various energy-related consequences.

As illustrated by the effects of Hurricane Katrina, any imbalance between the available supply of natural gas and demand can result in increased costs to end users, whether industrial or residential. The duration of higher prices is generally consistent with the imbalance in supply. Residential customers may also seek to heat their homes through other means such as increased use of fireplaces or wood burning stoves, which would result in additional particulate emissions in areas potentially in non-attainment for air quality. Additional demands for wood could increase wood harvesting activities or result in higher prices due to the increased demand and limited supplies.

Industrial end users, e.g., manufacturers, may increase the price of their products to offset the increased prices for natural gas or may need to curtail their production levels, cease production for a period of time, or close down permanently. Any of these options would result in consequences for consumers and employees and could affect the economy of the specific locale or related region.

Power generators in California, as indicated in the CEC's report, are major consumers of natural gas. Should supplies of natural gas be curtailed, such generators could be affected in a number of ways: (1) increased costs for fuel could ultimately be reflected in consumer costs for electricity; (2) power generation may need to be curtailed if natural gas supplies need to be allocated to power plants statewide; (3) plants may need to shut down temporarily or for an extended time if sufficient supplies of natural gas are not available; and/or (4) plants capable of using other fuel, i.e., fuel oil, may need to switch fuels, which would have air quality implications as well as other potential environmental consequences, e.g., increased potential for oil spills if the power plant is supplied through an offshore marine terminal. If less electricity is able to be generated through the use of natural gas, additional power-generating capacity may need to be developed at existing nuclear power facilities in California or by new generating plants using other fossil fuels such as coal. For example, Sempra Energy is proposing a new coal powered generating facility in near Gerlach in northern Washoe County, Nevada. Although the proposed plant is not within California, it proposes to use water obtained from within California. Further, air emissions and other indirect environmental impacts from the proposed facility may not be confined to Nevada.

It is also likely that other LNG or natural gas-related projects, e.g., pipelines, would be proposed (see Section 3.3.5) and pursued should the No Action Alternative be selected. MARAD, the USCG, and the CSLC have received an application for the Clearwater Deepwater Port Project from Crystal Energy, LLC (see Section 3.3.8.1). In addition, each of the lead agencies has been approached by Woodside Natural Gas, another Australian-based company, which indicates that it will also submit the appropriate applications for a proposed Federal Deepwater Port Act facility offshore California as early as the second quarter of 2006. Agency staffs have also been made aware of an additional proposal, Excelerate Energy's Pacific Gateway Project, which would be located in Federal waters offshore Northern California. No applications for that project have been filed to date (see Section 3.3.8.3). According to Excelerate's Website (www.excelerateenergy.com), an application for construction of the deepwater port off the coast of Northern California will be filed under the Deepwater Port Act in 2006, with an anticipated online date in the 2009 timeframe, with an expected capacity of 600 to

1,000 million cubic feet per day. No further information is currently available on this project.

Each of these proposed projects, or any other that proposes an offshore Deepwater Port Act LNG facility, may result in potential environmental impacts of the nature and magnitude of the proposed Project as well as impacts particular to their respective configurations and operations; however, such impacts cannot be predicted with any certainty at this time.

### 3.4.2 Alternative Deepwater Port, Subsea Pipeline, Shore Crossing, and Onshore Pipeline Location – Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline Alternative

One alternative mooring point location for the FSRU—in the Santa Barbara Channel (called the Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline Alternative)—was determined to be a reasonable alternative and has been carried through the alternatives analysis (see Figure 3.3-1 above). Like the proposed Project, this alternative could meet short- and mid-term natural gas demand. The proposed mooring point location is approximately the same as that of the Ventura Flats alternative site examined in the 1978 CCC study of potential offshore LNG terminal sites and technologies.

Located 6.9 NM (7.9 miles or 12.8 km) offshore of Pitas Point in the eastern Santa Barbara Channel, this site was determined by the CCC to be one of the most appropriate sites in California for a floating facility or a gravity-based structure based on the selection criteria described in Section 3.3.7, “Specific California Locations.” The CCC determined that this location would be the "most appropriate siting area off the shoreline of California ... [and][o]nly the floating type of offshore LNG terminal could be placed with confidence in this area because it is not dependent on favorable seismic and soil conditions of the sea bottom." The CCC report also notes that "[b]ecause of the site's distance from shore, a floating LNG terminal on the southeast Ventura Flats would have minimal adverse impacts on sensitive marine resources and public recreation along the coast. It would be visible on clear days from about 25 miles (40 km) of coastline, but it would look like a large tanker and would be beyond the ten offshore oil production platforms in the area. Another advantage is that there would be a comparatively short underwater gas pipeline to the Oxnard area that would not cross major earthquake faults" (CCC 1978b).

The proposed mooring point location is approximately 7.4 NM (8.5 miles or 13.7 km) offshore of Rincon Beach and approximately midway between two existing oil production platforms in the Santa Barbara Channel, Platforms Grace and Habitat. The alternative mooring location would be located approximately at latitude 34°14.410’N, longitude 119°30.916’W and would meet safety criteria because it would be more than 2.6 NM (3 miles or 4.8 km) from shipping lanes and existing facilities. It would be approximately 5.8 NM (6.7 miles or 10.7 km) landward from the coastal shipping lanes and more than 4.32 NM 5 miles or 8 km) from the nearest offshore production platform.

Pipeline routes connecting an FSRU at this location to the existing SoCalGas facilities at Ormond Beach would be difficult to locate since they would have to either cross or go around Hueneme Canyon. Given the depth and geologic instability in the vicinity of this canyon, the only viable route is south of the canyon. This route would require the pipeline to be located in or near coastal shipping lanes. Therefore, these routes connecting to Ormond Beach were not considered.

The most viable pipeline alternative for the Santa Barbara Channel mooring location would be to route the pipeline from the mooring location to the Reliant Energy Mandalay Generating Station shore crossing, north of Port Hueneme, where existing natural gas facilities also exist. These facilities would require upgrades to accommodate the transfer of the volume of gas being transported onshore. The Mandalay Generating Station is located near Oxnard Shores in Oxnard, and the pipeline would traverse parts of Oxnard. The Reliant Energy Mandalay Generating Station shore crossing is located between McGrath State Beach and Mandalay Beach Park.

The offshore pipeline would start at the mooring point in water approximately 265 feet (80.8 m) deep and travel southeast approximately 5.92 NM (6.8 miles or 11 km) southeast to Platform Gilda. The natural gas pipeline would then continue easterly approximately 8.5 NM (9.8 miles or 15.8 km) to the shoreline. This route would generally follow an existing utility ROW before it diverges in State waters and heads to the Mandalay Generating Station.

Similar to the proposed Project, it is assumed that the alternative shoreline crossing would be accomplished with HDB. The HDB exit points would be in a water depth of 43 feet (13 m), approximately 1.0 NM (1.2 miles or 1.9 km) from the shoreline. The HDB entrance point would be at an unspecified location at the Reliant Energy Mandalay Generating Station shore crossing. The length of the bore would be approximately 1.25 NM (1.4 miles or 2.3 km).

From the Reliant Energy Mandalay Generating Station shore crossing, the pipeline would be installed primarily in existing road ROWs. The pipeline would travel north along Harbor Boulevard and turn east at West Gonzales Road. The pipeline would follow West Gonzales Road to East Gonzales Road until Rose Road, where it would meet Center Road Pipeline Alternative 1 at milepost (MP) 8.0 and would follow that route to the Center Road Valve Station.

Like the proposed Project, a pipeline would have to be constructed in Santa Clarita along the Line 225 Pipeline Loop. The route through Santa Clarita for this alternative would be the same as the proposed Line 225 Pipeline Loop route.

### 3.4.3 Shore Crossing Alternatives

Two shore crossing alternatives for the proposed Project were retained for evaluation in this document and are described below. They represent alternative routes between the HDB entry and exit points and the connection to the SoCalGas pipeline ROW.

#### 3.4.3.1 Point Mugu Shore Crossing/Casper Road Pipeline Alternative

The Point Mugu Shore Crossing/Casper Road Pipeline Alternative would cross the Naval Base Ventura County (NBVC) Point Mugu to unincorporated lands in Ventura County. The Navy has not endorsed the Project or guaranteed the final routing of this alternative across Navy property. The HDB exit points would be at latitude 34°06.6587'N, longitude 119°09.7612'W. These HDB exit points are in different locations than the ones proposed in the October 2004 EIS/EIR and are closer to the shore crossing.

This alternative would also include two 24-inch (0.6 m) pipelines that would extend from the offshore HDB exit points approximately 0.8 mile (1.3 km) to the HDB entry points on NBVC Point Mugu (see Figure 3.4-1). HDB also would be used to install pipelines to a proposed new metering station located approximately 0.8 mile (1.3 km) at the southern end of Casper Road. The two 24-inch (0.6 m) diameter natural gas pipelines would terminate at the metering station. Approximately 1.5 miles (2.4 km) of additional pipeline would be installed from the new metering station to MP 2.4 of the proposed Center Road Pipeline along Hueneme Road. The total pipeline length would be approximately 3.7 miles (6 km). The HDB entry point would be in an area of the NBVC Point Mugu that was previously disturbed. Most construction and maintenance activities would occur on a remote portion of NBVC Point Mugu instead of a public beach.

#### 3.4.3.2 Arnold Road Shore Crossing/Arnold Road Pipeline Alternative

The Arnold Road Shore Crossing/Arnold Road Pipeline Alternative would also include two 24-inch pipelines and would begin approximately at the HDB exit points illustrated in Figure 3.4-1 and end at a connection at approximately MP 1.9 of the proposed Center Road Pipeline route at Hueneme Road and Arnold Road (see Figure 3.4-2). The HDB exit points would be at approximately the same location as the HDB exit points from the Point Mugu Shore Crossing.

This alternative would extend from the offshore HDB exit points approximately 1.06 miles (1.7 km) to the HDB entry points located approximately 1,000 feet (305 m) inland from the shoreline, near the end of Arnold Road, on lands in unincorporated Ventura County. From the HDB entry points, HDB also would be used to install the pipeline to the surface facility located approximately 0.6 mile (1.0 km) inland along Arnold Road on previously developed lands. The two 24-inch (0.6 m) diameter natural gas pipelines would terminate at the metering station.

Approximately 1.9 miles (3.1 km) of additional pipeline would be installed, using trenching, from the new metering station to MP 1.9 of the proposed Center Road Pipeline along Hueneme Road. Therefore, the total pipeline ROW length would be approximately 3.2 miles (5.1 km).

This alternative provides the decision-makers with another potential choice in locating the pipeline route.

Insert – (1 of 2)

**Figure 3.4-1 Shore Crossing Alternatives**

Insert – ( 2 of 2)

Figure 3.4-1  Shore Crossing Alternatives

Insert (1 of 2)

**Figure 3.4-2 Center Road Pipeline: Proposed and Alternative Routes**

Insert (2 of 2)

Figure 3.4-2  Center Road Pipeline:  Proposed and Alternative Routes

### 3.4.4 Alternative Onshore Pipeline Routes

The proposed Project has changed in response to agency requests and public comments. The proposed Center Road Pipeline described in Chapter 2.0, ”Description of the Proposed Action,” is a new route and Center Road Pipeline Alternative 3 is the same route as the proposed Center Road Pipeline route described in the October 2004 Draft EIS/EIR. Center Road Alternatives 1, 2, and 3 were retained for evaluation in this document and are described below. They represent alternative routes between the Reliant Energy Ormond Beach Generating Station shore crossing and the Center Road Valve Station.

#### 3.4.4.1 Center Road Pipeline Alternative 1

This alternative has been retained because it was the proposed route in the original application. As depicted in Figure 3.4-2, this alternative would follow existing utility ROWs and/or public roads as follows:

- Begin at the new metering station adjacent to the Reliant Energy Ormond Beach Generating Station shore crossing and then run northeast and north along the SoCalGas and Southern California Edison ROW and northeast on Pleasant Valley Road and then north on Rice Avenue;
- From Rice Avenue, proceed west on Gonzales Road, northeast on Rose Avenue, and under U.S. 101; and
- From the highway, proceed northeast on Rose Avenue, southeast and northeast on Los Angeles Avenue, north on La Vista Avenue, and west on Center Road to the Center Road Valve Station.

As stated above, it was retained for evaluation because it was the route proposed in the original application.

#### 3.4.4.2 Center Road Pipeline Alternative 2

Alternative 2 would follow existing utility ROWs, public roads, and/or newly acquired easements as described below. This alternative would avoid existing areas of dense residential housing.

- Begin at the new metering station adjacent to the Reliant Energy Ormond Beach Generating Station shore crossing and then run northeast and north along the SoCalGas and SCE ROW, east on Hueneme Road, north on Naumann Road, west on Etting Road, north on Hailes Road to Pleasant Valley Road, and north along Wolff Road (see Figure 3.4-2);
- At the intersection of Wolff and Sturgis Roads, continue north through agricultural fields, cross U.S. 101, and proceed northeast through agricultural fields to Central Avenue;

- At Central Avenue, head northwest, and in alignment with Beardsley Road, head northeast for approximately 0.25 mile (0.4 km), then northwest along a flood control channel (the Santa Clara Diversion) to Santa Clara Avenue; and
- Follow Santa Clara Avenue northeast and then continue northeast at Los Angeles Avenue, north at La Vista Avenue, and west at Center Road, to terminate at the Center Road Valve Station.

This alternative was retained for further evaluation because it avoids most of the population centers in Oxnard and Ventura County and traverses mostly agricultural areas.

#### 3.4.4.3 Center Road Pipeline Alternative 3

Alternative 3 is the former proposed Center Road route described in the October 2004 Draft EIS/EIR. Like the other alternative routes, Alternative 3 would follow existing utility ROWs, public roads, and/or newly acquired easements as described below. This alternative would avoid existing areas of dense residential housing.

- Begin at the new metering station adjacent to the Reliant Energy Ormond Beach Generating Station shore crossing and then run northeast and north along the SoCalGas and SCE ROW, east on Hueneme Road, north on Naumann Road, west on Etting Road, north on Hailes Road to Pleasant Valley Road (see Figure 3.4-2);
- At Pleasant Valley Road, head southwest for approximately 1,000 feet (305 m) and then turn north through agricultural fields, cross State Route 34 (5th Street), continue north along Del Norte Boulevard, and cross Sturgis Road to U.S. 101;
- At U.S. 101, travel east along the frontage road, then turn north and cross U.S. 101, then it would proceed northeast to Central Avenue, turn southeast along Central Avenue, northeast along Beardsley Road for approximately 0.25 mile (0.4 km), and northwest along a flood control channel (the Santa Clara Diversion) to Santa Clara Avenue; and
- Follow Santa Clara Avenue northeast, then continue northeast at Los Angeles Avenue, north at La Vista Avenue, west at Center Road, and terminate at the Center Road Valve Station.

This alternative was retained for further evaluation because it avoids most of the population centers in Oxnard and Ventura County; it traverses mostly agricultural areas; and it was one of the formerly proposed routes.

#### 3.4.4.4 Line 225 Pipeline Loop Alternative 1

The proposed Line 225 Pipeline Loop Alternative 1 would follow the same route as the proposed route from Quigley Valve Station to MP 4.75, where it would continue northwest on State Route 126 (Magic Mountain Parkway) (see Figure 3.4-3). This alternative would veer northwest around MP 5.5, following the SoCalGas ROW and

Insert Figure page 1 of 2

**Figure 3.4-3 Line 225 Loop Pipeline: Proposed and Alternative Routes**

Figure 3.4-3

page 2 of 2

terminating at Honor Rancho Valve Station #9A. It would cross the Santa Clara River at approximately MP 5.7 using an existing pipe bridge.

This alternative was retained for further evaluation because the route would be shorter, would traverse open land, and would provide an alternative stream crossing location.

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